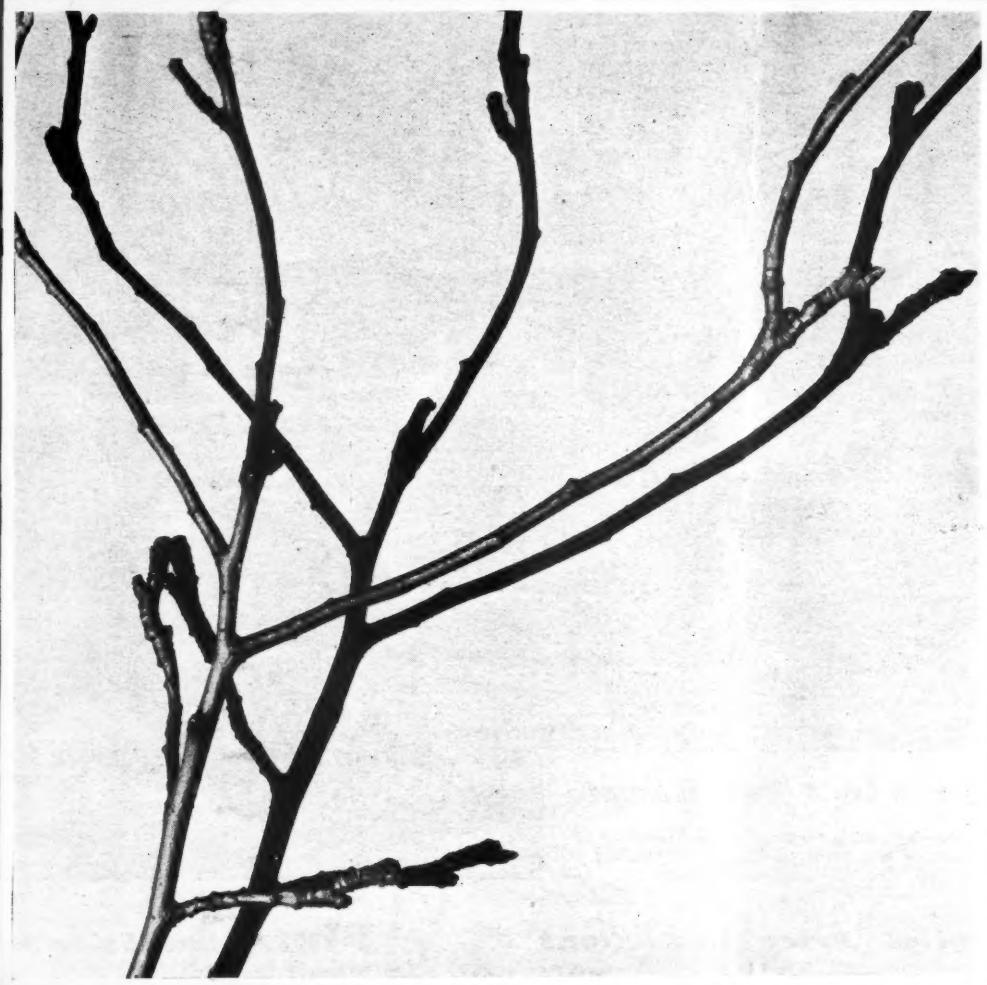


AMERICAN FRUIT GROWER



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FIRE BLIGHT FROM INFECTED BEEHIVES
HOW TO CONTROL DEER DAMAGE TO FRUIT TREES
CODLING MOTH CONTROL IN THE PACIFIC NORTHWEST
THE PROPAGATION OF THE APPLE
GROWERS CONQUER RASPBERRY DISEASES

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AMERICAN FRUIT GROWER

VOLUME 51

MARCH, 1931

NUMBER 3

HIGHER TAXATION ON TRUCKS AND BUSES?

THE RAILROAD interests, apparently alarmed over the continued loss of freight and passenger business to motor trucks and buses, are now promoting systematized propaganda in the interests of higher taxation and more regulation for their motorized competitors.

The charge of subsidization is raised and figures are presented purporting to show that the heavier types of trucks and buses pay less in taxes—license fees and gasoline taxes—per ton mile than do the lighter cars and trucks.

As an example, it is cited that the car weighing one ton and traveling 20 miles per gallon of gasoline, pays an average tax of four cents per gallon. This is compared to a 10-ton truck and its load, having a gross weight of 16 tons, which uses a gallon of gasoline for three miles of travel, and, paying the same tax per gallon of gasoline, moves its tonnage over the highway at half the cost per ton-mile as that paid by the small car.

By the citation of examples of this kind, the claim is set up that the commercial trucks and buses are using the highways at lower cost than is paid by the lighter trucks and passenger cars, and that such discrimination amounts to subsidization of the commercial motor vehicles.

Urgent suggestions are being put forth to the 44 State legislatures now in session that equity demands a general raise in tax charges levied upon the heavier classes of motor vehicles, and that public regulation, comparable to that now governing the railroads, be laid upon the common carriers using the highways.

In answer to these arguments, the motor traffic interests put forth figures purporting to show that the motor buses and trucks in commercial traffic are now paying a larger proportion of their gross revenues in the various forms of taxes levied against them than does any other public utility in the United States and that extensive regulations now cover every possible feature of operation including rates of fare, hours of service, all safety factors, size and weight of

equipment, speed of operation and liability and indemnity insurance.

It is the history of transportation in America that each succeeding form of transportation has been at first the beneficiary of subsidization in one or more of a

variety of forms. Early in our history the natural waterways were improved and canals built, at public expense, that commerce and travel might be expedited.

The railroads, in turn, were in the early days aided by land grants and cash bonuses to make easier their extension throughout the land. The rapid extension of the steel highways resulted in the eclipse of the busy traffic on our navigable rivers.

Motored transport has benefited from the improvement and extension of hard surfaced roads, though of late years there has been evident a more general disposition on the part of legislative bodies to make the automobile and truck pay its share of road building and maintenance costs.

The burdensome regulations and restrictions under which the steam roads are now laboring are but the natural result of acts for which the railroads themselves were responsible. Had the railroads not defied public opinion in the granting of discriminatory rates to favored concerns, building up big business at the expense of smaller enterprise, they would not now be groaning under the weight of the stifling regulations against which they now complain.

Or had the manufacturers of passenger and freight motor vehicles displayed the same languor toward improvements in mechanics and design as have the railroads, "horseless carriages" would still be chugging over mud roads at 10 miles an hour, and the railroads would have no motor traffic competition to fight.

The solution of the present difficulties of the steam roads does not lie in tying the hands of competition. Less, rather than more regulation, would be a boon to all forms of transportation. Taxation will always present discrepancies. Some graduated annual tax based on an arbitrary mean between weight and capacity of the motor vehicle may in time be worked out that will distribute highway costs equitably upon all users.

But the alive, progressive motor industry should not be shackled to keep its pace of progress down to that of the old, moss-covered steam transportation system—a system without sufficient vitality to widen the "standard" gauge that it outgrew a half century ago.

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AMERICAN FRUIT GROWER (Title registered in U. S. Patent Office)—Published monthly by International Trade Press, Inc., 53 W. Jackson Blvd., Chicago. Subscription: Domestic, three years \$1.00, one year 50c; Canada, 75c per year; Foreign, \$1.00 per year. Entered as second-class matter Jan. 22, 1931, at the post office at Chicago, Ill., under the act of March 3, 1879. Additional entry at Mount Morris, Illinois. Contents copyrighted by International Trade Press, Inc. Member Audit Bureau of Circulations.

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FIRE BLIGHT FROM INFECTED BEEHIVES

By H. R. ROSEN

NOT ONLY will the year 1930 be referred to in the future as one of the worst years of drought and of agricultural and industrial depression, but also as one in which fruit growers experienced one of the severest epidemics of fire blight that has yet been recorded. In horticultural circles the blight epidemic of 1930 will be compared with the notorious blight epidemics of 1826, 1832, 1844 and the California epidemics of 1905 to 1907.

While not all apple and pear sections of America suffered alike during this past year, nevertheless there occurred very serious losses in numerous States, including California in the West; Arkansas, Missouri and Illinois in the Middle-

disease has been known for over a century and has been the subject of innumerable articles, both popular and scientific, our ignorance of the disease and how to con-

who grow susceptible varieties will probably be driven out of the business of growing apples or pears on a commercial scale.

Old Control Measures Inadequate

As an illustration of our inadequate knowledge of this disease and what investigations may reveal, a review of some of the recent studies conducted by the writer will be presented.

The chief control measure which is relied upon at present for controlling this disease consists of pruning out and destroying all previously diseased wood prior to the development of new spring growth. This remedial measure is based upon the assumption that the germ responsible for this disease is capable of living over winter only in diseased wood of the previous season and that with the removal of such wood there will be no opportunity for the germ to gain entrance into an orchard save from some extraneous, unpruned and unkept trees.



West, and the Carolinas up to Pennsylvania in the East. It may be desirable to add here that the drought had no relationship to the blight epidemic, and that had not the dry weather intervened it is quite likely that we would have had even a greater amount of blight. The notion so common among gardeners and fruit growers that the weakening of malnutrition of a plant renders it more susceptible to disease is certainly not true for fire blight.

Those who read the April, 1930, number of *AMERICAN FRUIT GROWER* could have predicted that such an epidemic, at least on pears, would appear sooner or later. The truth of the matter is that while this

trol it is far greater than our knowledge of it. In thus emphasizing our lack of knowledge, there is no thought of disparaging the brilliant and epoch-making work of such men as Drs. T. J. Burrill, J. C. Arthur, and M. B. Waite, who laid the foundation not only for a study of this disease but for all bacterial plant pathogens. And, unless the fruit growers of America are willing to take the initiative in requesting thorough investigations of this disease and demand sufficient funds from the State legislatures and the United States Congress for the prosecution of such studies, most of those

This assumption in turn is based upon the belief that in the early spring the bacterial parasite oozes out of diseased tissues, that this sticky bacterial ooze is either visited by bees and other insects, which subsequently smear the blossoms and other organs as they happen to visit them, thus causing the blossoms to blight, or that a rain falling over the ooze disintegrates it, scattering it about on all the tree parts that happen to be in the path of the bacteria-laden rain drops and making possible the infection of susceptible tissues. But are these assumptions correct?

An Unfounded Assumption

For four successive seasons the writer, with the help of assistants, has attempted to locate bacterial ooze prior to the development of new

*Please turn
to Page 31*

PROPAGATION OF THE APPLE

By T. J. TALBERT

THE KAW RIVER VALLEY just west of Kansas City is noted for its production of fine seedling apple roots used as stocks for named apple varieties. Seeds from our cultivated varieties like Jonathan, Ben Davis, and Winesap may be used; but as a rule they lack virility and vigor and do not give as high a percentage of germination or produce as vigorous seedlings as the seeds from the French Crab, or wild apple. The so-called French Crab apple seeds are, therefore, generally used in growing apple seedling roots to be used for grafting and budding purposes in preference to seeds from the more easily procurable native named varieties.

In growing seedlings, the apple seeds, after being stratified, are planted from two to four inches apart in rows about four feet apart. When the young seedlings spring up, they should be given very thorough cul-

propagation of named varieties of apples.

Scion Wood and Its Care

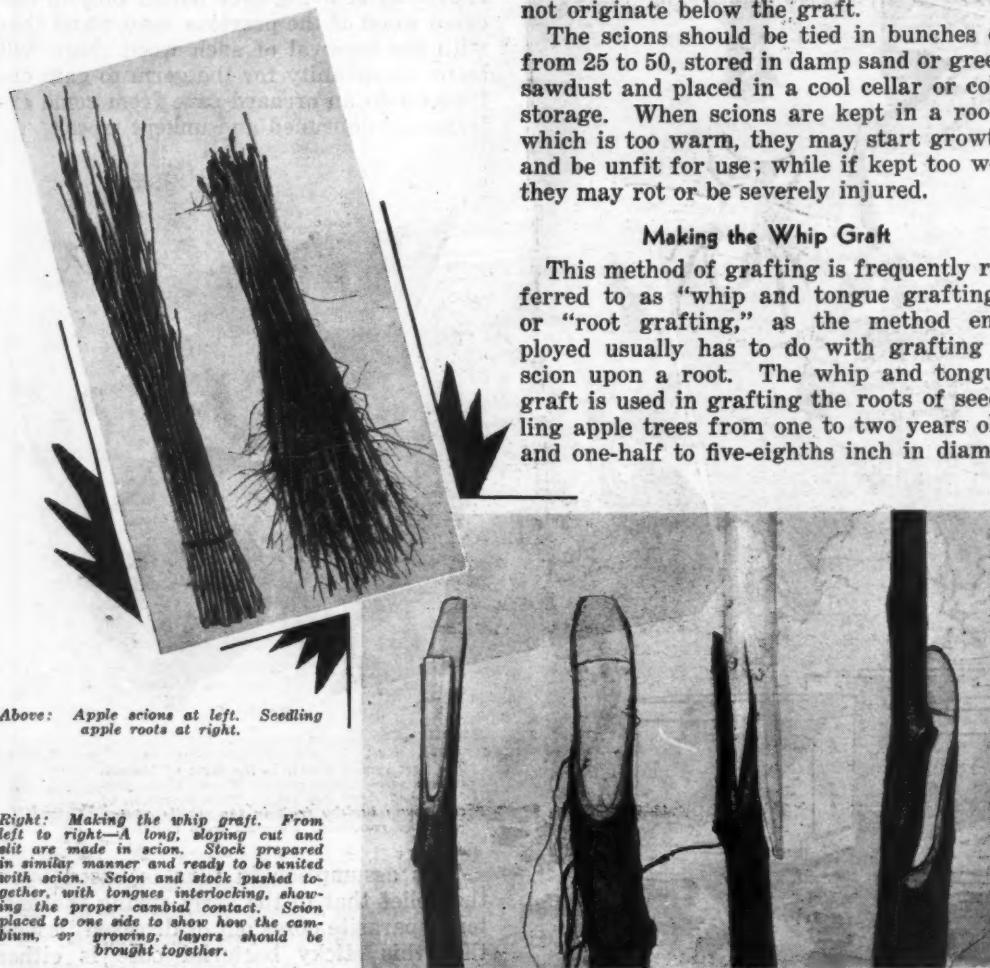
Scion wood is usually cut some time during the fall or winter from unfrozen, well-matured wood of the last season's growth. One-year old wood is preferred because experience has shown that its buds are more likely to grow successfully upon the stock than the buds from wood two or more years of age. The length of the scions will depend upon the amount of growth during the past season. This may range from 10 or 12 inches to 20 inches or more.

Scions should not be cut too long for convenience in handling and storing. When taken from frozen wood or wood which has been injured by low temperature, they may prove worthless. Water sprouts may be used if the wood shows no winter injury, is firm, well matured, and provided they do not originate below the graft.

The scions should be tied in bunches of from 25 to 50, stored in damp sand or green sawdust and placed in a cool cellar or cold storage. When scions are kept in a room which is too warm, they may start growth and be unfit for use; while if kept too wet they may rot or be severely injured.

Making the Whip Graft

This method of grafting is frequently referred to as "whip and tongue grafting" or "root grafting," as the method employed usually has to do with grafting a scion upon a root. The whip and tongue graft is used in grafting the roots of seedling apple trees from one to two years old and one-half to five-eighths inch in dia-



Above: Apple scions at left. Seedling apple roots at right.

Right: Making the whip graft. From left to right—A long, sloping cut is made in scion. Stock prepared in similar manner and ready to be united with scion. Scion and stock pushed together, with tongues interlocking, showing the proper cambial contact. Scion placed to one side to show how the cambium, or growing, layers should be brought together.

tivations during the growing season by plowing and hoeing. In the fall after the leaves drop the little trees are dug, if large enough. When they are considered too small for use they may be allowed to grow another year before digging. For convenience in handling, the tops are shortened after digging and the trees are tied in bundles of from 25 to 50 or more. They are then packed in boxes of green sawdust, damp sand, or other damp packing material and stored in a cool place. The seedling roots are used extensively for whip grafting in January and February. They are known as apple "stock" and are used in the

ter upon the scions (current season's growth, about the size of a lead pencil) of varieties of apples or pears to be propagated. The seedling roots and scions are usually removed from storage and grafted during January or February. A cellar or basement room is generally used for this purpose, but a drier and warmer room may be used if the scions and roots are kept in their original packages and covered except when in use. Scions, roots, or grafts should never be allowed to dry out. The roots may be from fourteen to eighteen inches long, and for grafting purposes they are frequently cut into pieces from three

to six inches long, the average being about four inches. Each seedling root, therefore, may make from two to four grafts.

In making the graft, a sloping cut about one and one-half inches long is made on one side of the upper end of the seedling root. The same kind of a sloping cut is made on the lower end of the scion. The knife is then placed on the sloping cut at a distance of about one-fourth to one-third inch from the end and a tongue is cut here on both scion and root.

They are then pushed together, the tongues of each slipping into the slits made for them. To complete the graft the scion and root are wrapped fairly tight with No. 18 or 20 knitting thread. Before tying the union or graft, however, it is important to see that the inner bark of both comes together at least on one side; otherwise, the graft is not likely to grow. Commercial nurserymen use machines for wrapping grafts. If the scion and stock are of different diameters, care must be taken to insure the proper interlapping of the edges, at least on one side. Poor unions invite crown gall or root knot and other troubles. The weak cotton string with which the stock and scion are wrapped will decay rapidly and cause no injury when the grafts are set in the soil. The finished graft, including the scion and root, should be about eight and one-half to nine inches long.

Storing, Planting and Cultivating the Grafts

The grafts should be packed in bundles of 50 to 100 each and stored in damp sand or green sawdust and placed in cold storage, a cool cellar or a callus pit until they are set in the nursery row in the spring. The soil for planting should be plowed in the fall in order that the grafts may be planted as early as possible. Prepare the ground as for a garden. The grafts may be planted either in holes made by a "dibble" or along the smooth straight edge of a furrow made by a plow. In either case, it is important to leave only the top bud of the scion above ground and to pack the soil tightly and firmly around the base of the root or graft.

If the young trees receive frequent cultivations throughout the spring and summer, they should grow to a height of two and one-half to three feet or more, when they are considered large enough for transplanting as "one-year-olds" any time during the late fall, early winter, or the following spring. They may also be dug and stored in moist sand or green sawdust like scions or seedling apple roots. If the trees are not large enough in the fall for transplanting, or if there is no ready sale, they may be left undisturbed in the nursery. The trees may be grown in the nursery row for another year and sold or transplanted as two-year-old trees, or they may be cut back in the spring to the original bud near the ground or just above the union of stock and scion. This usually causes a quick, vigorous growth of the tree and at the end of the growing season it is called a "cut-back" with a two-year-old root and a one-year-old top.

HOW TO CONTROL DEER DAMAGE TO FRUIT TREES

By E. M. MILLS

DURING the past three seasons the writer has carried on experiments for the purpose of determining the most successful methods of protecting orchard trees from deer. Various ideas have been tested out in a number of New England orchards. The following methods have been tried out with variable results. In some cases control was 100 per cent effective, and in others the repellents were of little value. As the cost of treatment is relatively small, and since there is a chance for success, these methods are recommended for further trial by interested orchardists. Further study will be necessary to determine the cause of variable results, such as scarcity of food supplies.

ways: first, the ends of the lateral branches are eaten, particularly the new growth, from the time of planting until the trees are five or six years of age, or until they attain sufficient size to be beyond the reach of the animals; second, the fruit and leaf spurs are removed from the lower branches of older trees; and third, the trunk and branches of both young and old trees are

horned. Horning is the rubbing of the antlers of the deer against the tree.

It does not require many deer to do a considerable amount of damage. One orchardist reports 87 two-year-old trees destroyed in three nights by one deer, as shown by the easily followed tracks. In the same orchard 175 trees were destroyed in one night by six deer. An entire orchard of 1000 young trees was totally destroyed and abandoned.

Unsuccessful Methods of Control

Scaring devices, such as white or colored rags hung on each tree, have not proved very satisfactory. In one instance white rags were tied to 300 apple and peach trees, and at the end of three years the trees had been damaged so badly that they were plowed up.

Several kinds of sprays have been used on fruit

Left. A sample of deer damage. (Photos from U. S. Biological Survey.)



Center. Automatic flash gun for protecting trees to protect tree from deer damage.

Left. Tree protected by repellent hung in bag.

trees to repel deer. Deer have been observed to browse on trees almost immediately after an application of lime-sulphur or nicotine dust. Double-strength kerosene emulsion as applied for aphids has been reported to keep deer away from young trees for a week. A combination of Paris green and lime was effective for a short time, according to one orchardist.

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sary to determine the cause of variable results, such as scarcity of food supplies.

Habits of Deer

Deer feed chiefly at dusk and early dawn, although they may be active during the entire night. The time of year when they damage trees varies from place to place. Ordinarily, when the new growth starts in April and May, deer begin to feed on this tender food and continue to do so through June and July. In some places deer injure trees only during the summer months, while in other orchards the feeding goes on the year round.

Deer show a distinct preference for cultivated plants where these are present. They will turn from laurel, berries, and buds and twigs of the woods to alfalfa, clover, garden crops, and young fruit trees. Among fruit trees, apples are preferred to peaches, and cherries are the least attractive. Even among apple trees, in one orchard the McIntosh was relished more than the Delicious, and in another, the Alexander was apparently liked better than the Northern Spy.

Deer injure fruit trees in three different

CODLING MOTH CONTROL IN THE PACIFIC NORTHWEST

By R. L. WEBSTER

BECAUSE IT IS NECESSARY to ship apples long distances, high standards have been enforced in the Pacific Northwest, and boxed apples must be reasonably free from blemishes caused by the codling moth and other insects. This condition of affairs makes it imperative that the Washington fruit grower be more than usually alert in all his spraying operations. Probably nowhere else in the country have spraying operations been developed to so high a degree.

High Pressures Used

Again, with the general use of the spray gun in these irrigated valleys, high pressures are necessary, and spraying outfits constructed to deliver from 300 to 400 pounds are in general use. In addition, the development of stationary spraying outfits has made more efficient the spray applications formerly accomplished with portable outfits. There are approximately 800 stationary spraying plants at the present time in the Wenatchee Valley, and a large number are being installed in the Yakima Valley.

At the present time in the heart of the apple growing district six cover sprays are applied in addition to the calyx spray. In districts more or less isolated, where the altitude is higher, the number of cover sprays is reduced. In the Okanogan Valley one or two cover sprays are sufficient, since the second brood of the codling moth is relatively slight. On the other hand, in the lower Yakima Valley spraying may actually be continuous during the season, especially in those years favorable to the development of the insect.

Use of Traps for Timing Cover Sprays

Five years ago it was customary with many growers to adhere to what was called a 10-day program for making applications of lead arsenate during the season. This policy was recommended in the attempt to keep fruit protected from worms and stings during the entire season. With the general use of the codling moth traps as indicators of moth emergence, a possibility first pointed out by Anthony Spuler of the Washington Experiment Station at the annual meeting of the State Horticultural Society at Wenatchee in 1926, information was made available by means of which cover sprays could be more accurately timed from week to week throughout the season. The use of these traps in this way has been of immense value to the apple industry in checking damage by the codling moth. The principal value of the traps is to time cover sprays, although the actual destruction of the thousands of moths in the orchard every season is, of course, a factor of no small importance.

In the Wenatchee Valley the State Department of Agriculture has placed these emergence records in conspicuous places along the highways, where the daily records may be readily noted by orchardists in the immediate vicinity. These daily emergence records are obtained from some

near-by orchard and serve as a guide to growers in that particular locality.

Several large organizations also make use of these trap records as a basis of making recommendations to their own growers. The American Fruit Growers' organization employs one man, a former student at the State college, who devotes a large share of his time to collecting these data from or-

The difficulty in checking the insect during the summer has led to the use of the oil-lead arsenate combination. At the present time we are recommending a spray application consisting of lead arsenate, used at the rate of two pounds to 100 gallons of water, to which is added one gallon of commercial summer oil containing approximately 75 per cent of the actual oil.

This combined spray serves both as an ovicide and as a larvacide, since there is sufficient oil in the combination to kill a large share of the codling moth eggs and a sufficient amount of lead arsenate which serves to check those larvae which attempt to enter the fruits. The oil-lead combination serves best when used at the peak of egg deposition, a time which may be determined fairly accurately by a careful study of moth emergence records during the season.

Apples sprayed with the oil-lead arsenate combination, particularly if several applications have been made, may be difficult to wash. This is especially true when the oil-lead combination is used for the second brood. Where this combination has been used previous to July 25, there has been no difficulty in reducing the arsenic load to below the tolerance with the ordinary washing methods. Where late applications of this combination have been made, or where there has been undue delay in washing the fruit, cases have occurred where removal of the residue has been a difficult matter.

Oil-Nicotine Combination

The desirability of using some non-arsenical for the late cover sprays has led to the use of the oil-nicotine combination, which Mr. Spuler has found in his work to be very effective in codling moth control. As already pointed out, lead arsenate in combination with oil, either mineral or fish oil, is more difficult to remove, especially when applied in the late cover sprays. In consequence, the use of the nicotine-oil combination is being recommended, to replace applications of lead arsenate late in the season, i. e., after July 25. This combination consists of one gallon of summer oil emulsion to which is added nicotine sulphate at the rate of three-fourths pint to 100 gallons of water. Careful checks at Wenatchee during the past season show that this combination is equal to lead arsenate used at the rate of three pounds to 100 gallons of water.

Because of an insufficient supply of nicotine sulphate in 1930, due to abnormal large demand that year, this material was probably not nearly as widely used as it would have been had there been more available. Many growers are already using it and indications point to a greater use of the oil-nicotine combination in 1931. Foliage of apple trees sprayed with this oil-lead combination, or with the nicotine-oil, has been particularly free from damage by red spider, leaf hopper, and aphis infestation. Freedom from injury of this kind is sometimes actually reflected in an increased size of apples produced.



Counting the moths in a day's catch in the trap

chards in various locations in the Wenatchee Valley. The "Big Y" organization (Yakima Fruit Growers' Association) last summer utilized a string of traps in the Yakima Valley covering 17 locations from Kennewick, in the lower valley, with an altitude of less than 400 feet, to Naches, near Yakima, at an altitude of about 1400 feet. This is an organization of some 1300 growers holding about 13,000 acres of bearing orchards which produce between 5000 and 6000 carloads of fruit annually. A. L. Deaver, who directed this work, tells me that this organization depends entirely on the use of the traps in making recommendations to growers for timing cover sprays.

Oil-Lead Arsenate Combination

The experience of growers has shown the great difficulty of preventing worm entries by the second brood of larvae. Detailed insectary experiments by Mr. Spuler carried on in the field laboratory at Wenatchee have shown that between 40 and 50 per cent of the worms placed on apples sprayed with lead arsenate at the rate of two pounds to 100 gallons of water actually gained entrance without being poisoned.

You'll delight
in the wonders of Seattle
and the Puget Sound Country

on the

AMERICAN FRUIT GROWER'S ESCORTED, ALL-EXPENSE TOUR

July 18 - August 3, 1931

WITHOUT DOUBT, some of the keenest enjoyments of your entire trip through America's scenic pleasurelands on the AMERICAN FRUIT GROWER'S 16-day Wonder Tour via The Milwaukee Road will be found in Seattle, Wash., and that part of the great Pacific Northwest of which it is the center.

Seattle, and Tacoma just to the south, are the two wonder cities of the Pacific Northwest. Not so many years ago only small fishing villages, they are today the hubs of an enchanted summerland of mountains and seashore; centers of remarkable industrial and agricultural development; gateways to Hawaii, Alaska and the Orient. On their docks East meets West; romance vies with commerce.

The itinerary of the AMERICAN FRUIT GROWER's tour provides for a full day in Seattle. Shortly after breakfast our autos will call for us at the New Washington Hotel and make a tour through the city and its environs, including the beautiful Queen Anne Hill district, probably the city's finest residential section, and the Skyline Boulevard. The morning will end with a two-hour boat trip through Lakes Washington and Union, the Government Canal Locks, Puget Sound and Elliott Bay. The afternoon will be free for further city sightseeing, which should include the noted municipal markets where much of the fruit that is grown in the vicinity of Seattle can be found on display.

Concerning Seattle Herself

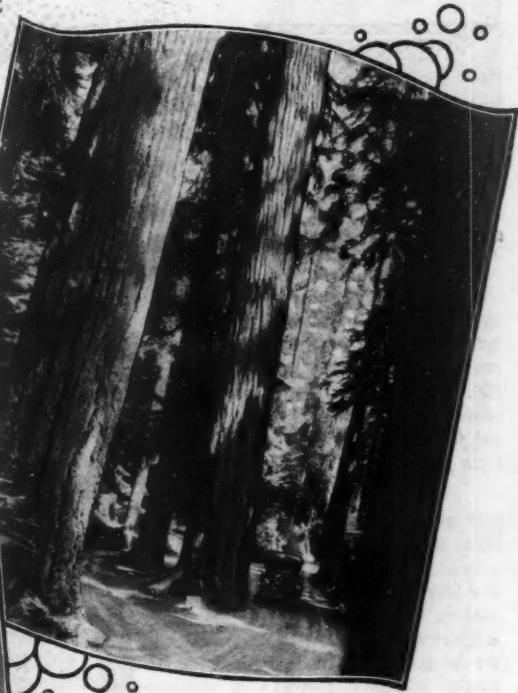
There is a distinct fascination about Seattle, the metropolis of the Pacific Northwest. Many people consider it one of the

most beautiful cities in the world. The late Frank Carpenter, oracle of pictorial geography, once declared: "In my opinion, the title to the world's largest city of greatest scenic beauty lies between Seattle and Constantinople." And he knew the cities of the world.

So recently was Seattle's site nothing but a forest that one is constantly reminded of the fact. Imagine, if you can, a city with all the verve and flash of Chicago, containing within its limits many acres of virgin forest. Situated on numerous hills, Seattle faces the rugged Olympics in the west; lordly Mount Baker gleams to the north; grand Mount

Rainier looms close in the southern sky; and between them stretch the white summits of the Cascade Range. In the early morning, one watches the sun rise rose-pink over the majestic Cascades, strike the waters of 27-mile long Lake Washington, inside the city limits, and gleam on the wavelets of Puget Sound.

Over twice the area of New York's Central Park is included in Seattle's park system, where one may swim in the ocean, picnic, canoe, fish, play tennis or golf, ride horseback for miles through landscaped beauty—and never feel crowded. The parks are connected by miles of superb boulevards and reveal at every turn gorgeous vistas of mountain, lake and sea. Here is what awaits your choice during your stay in Seattle. For a band concert, or the zoo, a woodsy walk, or a sylvan supper—Woodland Park; for more formal beauty, Volunteer Park; for salt water bathing, Alki Beach; for fresh water canoeing, swimming, yachting, Leschi on Lake Washington; for an unforgettable [Please turn to Page 30] view, Kinnear; for a quiet [Please turn to Page 30] view, Kinnear; for a quiet

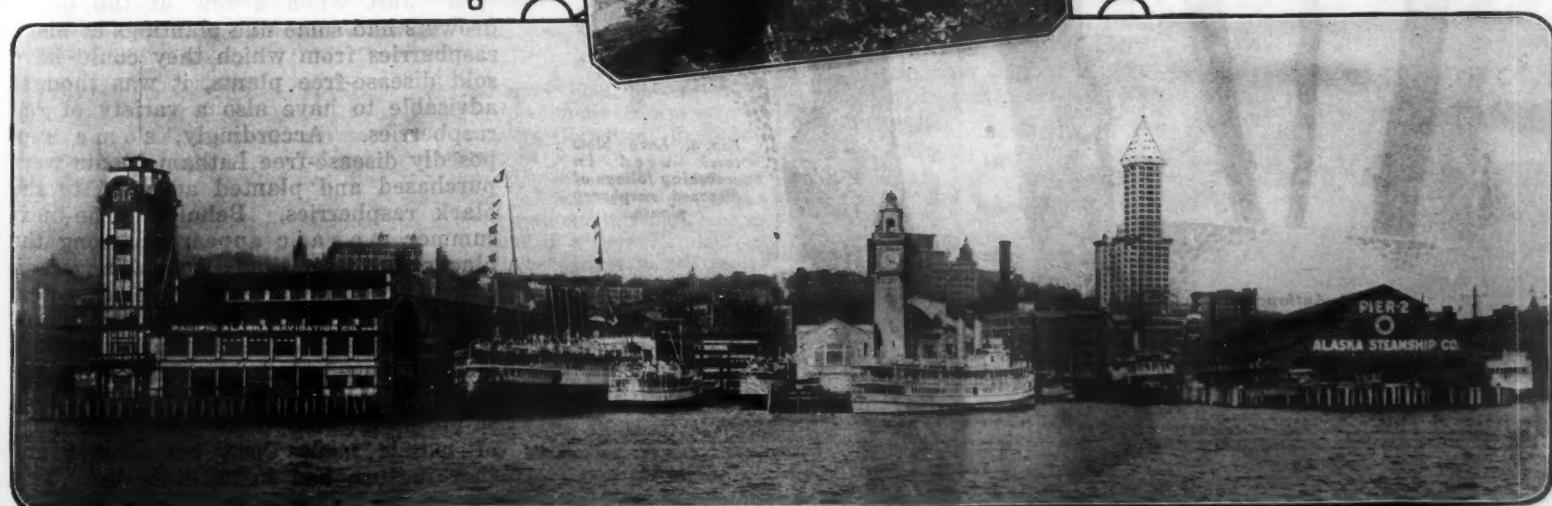


Big Douglas firs in Rainier National Park. These trees measure 10 and 12 feet in diameter.



Branches of a large evergreen on Wahpenayo Peak seem to be protecting the summit of the mountain, Rainier National Park, Washington.

The Seattle waterfront.



GROWERS CONQUER RASPBERRY DISEASES

By A. L. PIERSTORFF

ONE OF THE COMMONEST troubles in both black and red raspberries is mosaic. This disease is caused by a virus, or a combination of viruses, and there are at least three types of mosaic now recognized on raspberries. All three types exhibit a mottling of the leaves early in the spring. The newly developed foliage shows alternate dark and light to yellow-green areas in a mosaic pattern; or the leaves may contain almost pure yellow spots between the green areas, or a mixture of yellow and light green areas between the normal green of the leaf.

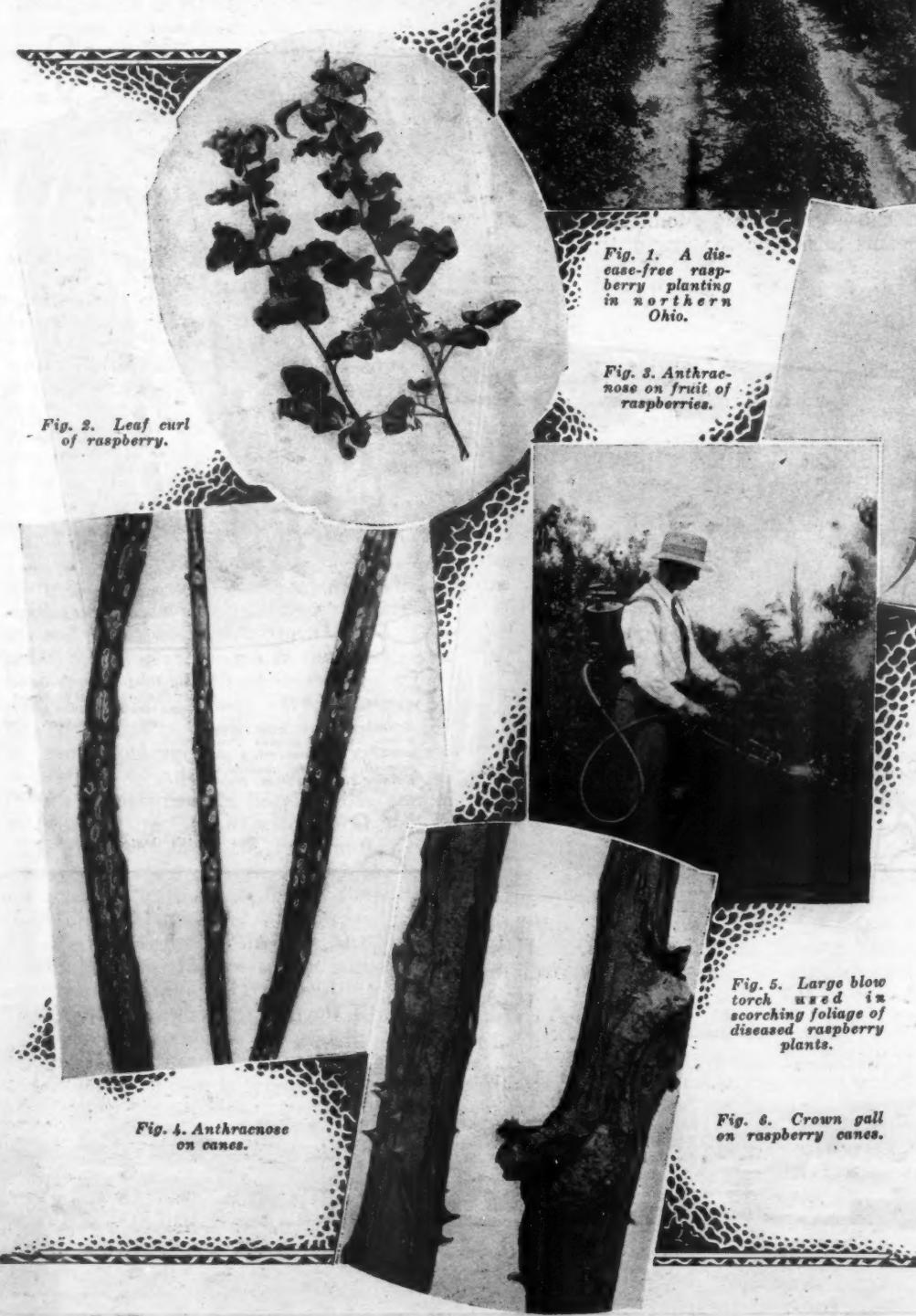
Still a third type of mosaic is visible only as a very slight mottling early in the spring. As warm weather approaches,

the mottling on many varieties disappears. When the stems and roots of infected plants are examined externally or sectioned, no signs of the disease can be detected. The fruits, however, are

smaller than normal, appear seedy and crumble easily. Mosaic infected plants are smaller than normal plants, the canes are more slender and fewer in number, bearing less fruit, and after being infected for one or two years are more subject to winter killing than normal plants.

Varietal Susceptibility

Different varieties vary greatly in their susceptibility and in their ability to withstand mosaic after infection has occurred. Red varieties, like Cuthbert and Latham, are very susceptible, but are able to withstand the effects of the disease fairly well. Black raspberries, like Cumberland, are not as subject to attack, but after infection show more dwarfing and decrease in yield. The Latham variety almost invariably carries a medium type of mosaic, which apparently does not harm it to any great extent, but when this virus crosses over to Plum Farmer, or Cumberland, it dwarfs these black raspberries severely; sometimes it actually kills the plants and



in all cases decreases the vitality to such an extent that the plantings are no longer profitable.

Finding out this little point cost the Ohio raspberry growers thousands of dollars. Just when a few of the better growers had some fine plantings of black raspberries from which they could have sold disease-free plants, it was thought advisable to have also a variety of red raspberries. Accordingly, some supposedly disease-free Latham plants were purchased and planted adjacent to the black raspberries. Behold! The next summer mosaic appeared among the blackcaps faster than it could be eradicated. The red varieties were suspected, and inoculations proved them the source of the mosaic. The Latham plantings were removed, but in many cases the black raspberry plantings had been so severely infected that the percentage of mosaic made them unprofitable and they in turn had to be discarded. This taught us a valuable lesson, namely,

that as a general rule red raspberries should never be placed anywhere near black raspberry plantings.

Keep the Blacks and Reds Separated

You ask, how far is it necessary to separate red raspberries from black raspberries to make sure the blackcaps do not become diseased? We wish we knew what distance was safe at all times. In some cases 20 rods is far enough, but we have had plantings infected from an old diseased patch for a distance of a quarter of a mile. One Ohio grower, who was attempting to produce disease-free plants, had a neighbor whose raspberry planting (over one-fourth of a mile distant) was badly infected. Virus diseases appeared more rapidly than they could be eradicated, and this grower had to discontinue his planting because his neighbor would not remove his diseased patch.

Very few growers have a farm large enough to grow both ordinary and disease-free plantings. The direction of the prevailing wind, intervening windbreaks and other variable factors must be taken into consideration. The disease-free planting should be to the windward side of any old plantings and as far distant as possible.

"Curl" and "Streak"

Some small bushes with dark green leaves with the leaflets rolled downward and inward may be noticed in many plantings of ordinary raspberries. The canes are considerably shortened so that the entire bush has the appearance of having been pushed together. This disease is called "curl" (Fig. 2). Such bushes produce little or no fruit of marketable berries. Among the red varieties, Cuthbert, Latham and Viking are attacked, while King and St. Regis are fairly resistant. Among the blackcaps, Cumberland and Gregg are the most susceptible to curl, while Plum Farmer is fairly resistant.

Another virus disease, which extracts its toll from the raspberry plantings in Ohio, is known as streak or rosette or blue stem. This can be easily identified during July and August by the purple or reddish streaks, about the size of a lead pencil, appearing on the canes. Sometimes this streaking of the canes is absent, but the leaflets are twisted and distorted. In some cases they may be slightly rolled and in other instances severely cupped downward, often accompanied by obscure mottling. Infected plants may not be killed for several seasons, but their vitality may be decreased to such an extent that they are winter killed, and in any case they will never produce a crop of marketable berries.

Remove All Diseased Plants

All of the virus diseases are systemic and for that reason sprays or

dusts are of no avail in their control. Mosaic and curl have definitely been proved to be transmitted by raspberry aphids. The large raspberry aphid is the chief disseminator of mosaics, and the small aphid is blamed for spreading curl. Streak is thought to be carried by insects, but so far control experiments have failed to prove this point. Since it is impractical to try to eliminate the aphids from raspberry plantings, the only control remaining is to remove the diseased bushes. This is the control now practiced by most commercial growers in Ohio and other States, where disease-free plants are grown.

When roguing was first started, it was almost impossible to decrease the percentage of original infection, and this was hard to understand until it was noticed that by digging out the bushes and carrying them from the plantings, the aphids were knocked off and proceeded to crawl to healthy plants. Now the foliage is first burned from infected plants by a large blow torch as shown in Figure 5. By systematic roguing, many Ohio growers have been able to reduce the percentage of all virus diseases combined to less than one per cent.

Crown Gall

Another serious enemy to the raspberry industry is crown gall (Fig. 6). This bacterial organism seems to have a decided liking for raspberries, and since raspberry roots are shipped long distances, it has become widely disseminated. Crown gall on raspberries can be easily recognized by the tumors or large growths which form on the canes, crowns or roots. The organism is spread in the planting by cultural methods, and probably largely by drainage water. A few infected plants, if not promptly removed, are sufficient to cause a general infection throughout a field and thus make raspberry growing unprofitable.

This disease has also been constantly fought by the Ohio raspberry growers, who are members of the Ohio Small Fruit Improvement Association. We now have a number of plantings in Ohio where crown gall-free plants are available.

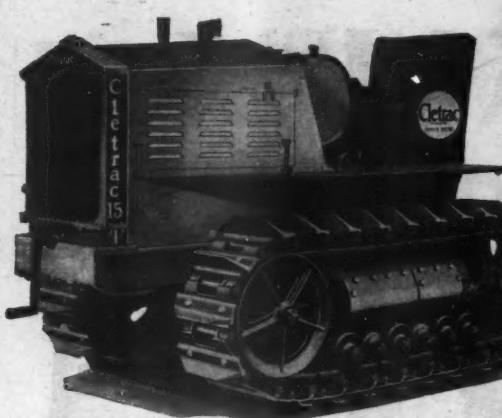
The tolerance limit for registered raspberry plants, which are offered for sale by the Ohio Small Fruit Improvement Association, cannot contain more than one-tenth of one per cent crown gall infected plants. That is, if more than one infected plant in 1000 is found in a grower's planting from which he desires to sell registered raspberry plants, that grower is not issued a certificate and the disease must be eradicated and the plants grown another season before being offered for sale as registered plants.

Fungous Diseases

There are also several fungous diseases against which the grower of

(To Page 32)

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FINE, plump fruit and lots of it. Firm, uniform beauties — BRINGING TOP PRICES! That, in brief, is successful fruit growing!

Faithful work — thorough work that unfailingly keeps to schedule — is always back of annually repeating yields like this. And of vital importance is the tractor that handles the job.

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Here is power, ample for the heavy pull of deep-set discs or other implements — power that can walk up stiff grades with less gear shifting — power that gets the maximum work out of your equipment. Here is speed that covers the ground quickly. Here is traction that doesn't slip — tread that is light and doesn't pack the soil.

This Cletrac "15", like the four other Cletrac models has the famous system of automatic lubrication to track wheel bearings and other points outside the motor. No time out for the mean job of daily hand oiling. All bearings are thoroughly safeguarded against dirt and grit by means of dust-proof packing and covering.

Power steering is another big Cletrac feature that is yours with the Cletrac Fifteen. A light touch on the controls turns the tractor right or left — the motor doing the work. A short turning radius of 8 feet makes it easy to work among the trees and in close quarters. The Cletrac method of planetary gear steering is a patented and exclusive feature of all Cletracs.

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Tree Tanglefoot comes ready to apply—requires no mixing, and never injures trees or vines. Easily applied with a wooden paddle, and one pound makes 15 or more lineal feet of band.

Use Tree Tanglefoot for waterproofing tree crotches, cavities and wounds. It also is better than grafting wax for grafting operations. Tree Tanglefoot is sold at seed, hardware and drug stores in convenient sized packages for orchard and garden use. Keep a supply on hand at all times. Order it today.

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QUESTIONS AND COMMENT

Conducted by T. J. TALBERT

Questions on fruit growing problems and on general horticulture will be answered through this department if of general interest. For reply by mail enclose 2c stamped envelope (air mail 5c). Address AMERICAN FRUIT GROWER, 53 West Jackson Blvd., Chicago.

Pruning Locust-Damaged Trees

I am particularly interested in the pruning of apple and peach trees as I find that the swarms of 17-year locusts that visited my orchard last spring (1930) deposited their eggs in the growth of the previous year and so badly punctured the under-side of the limbs that I am taking them off below this growth. As the trees are only about five years old, there is not much left and it leaves a badly shaped tree, especially since the damage is greater on the outer limbs that are necessary for an open head. If you have had any experience with the work of these pests, and can give any advice, it would be thankfully received.—R. E. H., Nebraska.

In pruning your apple and peach trees which were damaged by the 17-year locusts in 1930, it is suggested that you remove all dead and dying branches. To prevent making an ill-shaped tree, however, some of the branches which show considerable injury might be left, as the wounds may heal and the branches be satisfactory for fruiting. It may be possible in this connection to remove some of the severely injured branches at a later date; particularly will this be true when newer and better branches are developed.

The peach trees may be pruned much more severely than the apple trees, although, as suggested above, it is not advisable to prune either of the trees too severely, as this may delay bearing and have a dwarfing effect upon the trees.

Killing Bermuda Grass

Will you kindly advise me the most economical and successful way to kill Bermuda grass without injuring the soil?—C. H., Texas.

Perhaps the most economical and successful ways of killing Bermuda grass without injury to the soil consist of: (1) Thorough and timely cultivation throughout the spring and summer to keep down all growth of the Bermuda grass. (2) The use of poultry, hogs, or other livestock in such numbers as to keep the grass eaten off into the ground; thus preventing growth and the storing of plant food materials in the roots of the plant.

If chemicals such as common salt, iron sulphate, or sodium chloride, and others, are used, the soil is generally made undesirable for growing crops for at least a time.

Stayman Susceptible to Root Rot

We are troubled with Stayman Winesap trees producing poor root systems that cause them to turn out of root or die at five to 10 years of age. About 10 per cent of our Stayman trees are doing this. Other orchards I have seen also show that the Stayman has a poor root system.

I am wondering if it might be possible to topwork Stayman or Staymared on some other variety that has sturdy roots and thus avoid the above difficulty. Had considered Jonathan for this purpose but Prof. Frank Beach (Ohio Hort. Society) says he fears Jonathan would stunt size of Stayman fruit and suggests such a variety as Talpahocken (Fallawater) instead.

Do you have any data showing how Stayman reacts to topworking on other varieties and if so which have been found most congenial? If you have no data to offer, what would be your theory?—E. J. D., Ohio.

It is true, as you say, the Stayman variety of apple does seem to have a root system that is fairly susceptible to root rot and other root diseases which cause the trees to often turn over at ages ranging from seven to 10 years. Well-drained soil seems to give a less percentage of root injury than soils which may be poorly drained at certain seasons of the year.

It is possible that through topworking the Stayman or Staymared variety may be grown profitably upon sturdier and

hardier rootstock, such as the Fallawater, Minkler, Northern Spy, and others.

There is little experimental evidence to show that the above stocks would be suitable under all conditions to Stayman and Staymared, so the above suggestion is based largely upon experience and observations.

Varieties, Planting Distances, Etc.

As I am planning to go into the fruit growing business, I would like a few suggestions from your magazine. The farm will be located about 20 miles east of Hamilton, Ohio. And I would like to know what apple, pear, plum and cherry trees grow best and produce the best results. Would also like to know how many trees of each kind of fruit could be planted per acre and if the fruit could be marketed between Dayton and Cincinnati, Ohio. How many acres would have to be planted to clear about \$2000 per year? What would be the cost per tree?—G. M., Michigan.

Your Agricultural Experiment Station, Department of Horticulture, located at Wooster, Ohio, is capable of giving you more reliable information as regards to the best varieties of apple, pear, plum, and cherry trees to plant near Hamilton, Ohio. It is suggested, therefore, that you make your request to the address given above.

You should be able, also, to obtain information relative to planting distances and number of trees per acre. As a guide in this regard, however, it is suggested that apple trees be planted not less than 35 feet apart each way, and in some instances perhaps 36 or 40 feet apart each way would be even better. Trees planted 35 by 35 on the square plan would give 35 trees per acre, while if planted 40 by 40 would give 27 trees per acre. Pears are planted from 27 by 27 or 30 by 30, generally; and this would give around 60 or 49 trees per acre. Plums and cherries are generally planted at the rate of 22 to 24 feet apart. This would give, at 22 feet apart, 90 trees per acre; and at 24 feet apart, 76 trees per acre.

In all probability a good market for your fruits would be afforded at Dayton, Cincinnati, and other centers. In order to make \$2000 per year, the number of acres is not as important as the care and management of the acres planted. In this regard, therefore, it is suggested that you start on a comparatively small scale with your planting and gradually grow or develop into the fruit growing business.

Crown Gall of Grapes

I am mailing you some cuttings of my grape vines. As you will see, they are badly diseased. If you can give me some information on how to control this disease and keep it from spreading through the vineyard, I will appreciate it greatly. If the old stalk is cut off, will the new shoots below come out healthy? Also, should they be sprayed with some special solution?—A. H., Kentucky.

A careful examination of the grape cuttings which you sent shows a serious infection of the bacterial disease known as crown gall. We regret to advise that there is no satisfactory control of this malady. This is particularly true where the infection has reached as serious a stage of development as is true in the case of your vines.

In the control of the disease, however, it is very important that the grower start with healthy vines which are free from crown gall. Moreover, it is well to make sure if possible that the vineyard is started on soil where the infection is not present. That is, if blackberries, fruit trees, or other fruit plants have grown on the soil and show infection of crown gall, it is possible that grapes when planted in such soil may become infected unless a considerable interval of time has existed between the removal of

March, 1931

AMERICAN FRUIT GROWER

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the infected plants and the planting of the grape vines.

The cutting off of the old canes as you suggest will not rid the plants of crown gall infection, because the roots or at least the crowns of all the grape canes no doubt show as serious infection as the canes above ground. It is important, however, that all grapes be sprayed where black rot, mildew, or other fungous diseases are prevalent. Moreover, it may also be important to spray in order to control such insects as grape berry moth, curculio, flea beetle, leaf folder, root worms, and others.

For all the vines affected as badly with crown gall as those which you sent for examination, there is no question but that the vines, including the roots, should be removed; and if the infection has spread to all the vines, it would be more profitable to start a new vineyard on uninfected ground.

Controlling Rabbits and Mice

I would like to ask you if there is any danger to fruit trees of any age in painting the trunks with pure commercial lime-sulphur. I think it would be a protection against rabbits and mice. I would not, however, want to use it if it would cause injury to the trees.—L. L., Illinois.

While there is not much danger, if any, due to painting the trunks of fruit trees with undiluted commercial lime-sulphur, yet there might be in some instances.

Moreover, no repellents or washes that we know are absolutely proof against injury by rabbits and mice. For this reason, to obtain the best protection, use screen wire or chicken wire, wood veneer wrappers, or old newspapers around the trunks of the trees.

The screen wire wrappers have the advantage in that if they are made large enough and extend out well from the trunks, they may last several years; and if pushed into the ground two or three inches, they will serve, also, as protection against mice as well as rabbits.

Newspapers if wrapped around the tree trunks in the winter season should be removed in the spring. It is true, also, that the screen wire or chicken wire may remain around the trees during the summer and fall season, when some injury may be done by rabbits at certain periods. In other words, the wire screens give protection throughout the year.

Grading Peaches and Apples

I would like to know the details concerning the grading of peaches and apples. What are the requirements of Extra Fancy, Fancy, "C", etc? What is the size of each in diameter?

Is it possible for one to make a grading machine? I have 100 acres in summer and winter apples, seven varieties, and 28 acres in peaches. Elberta. My trees are nine years old; expect 3000 to 4000 bushels.—H. A. O., Missouri.

The details concerning the grading of peaches and apples would make a rather long story. It is suggested, therefore, that you request the following publications:

For Peaches:

Missouri Experiment Station, Columbia, Missouri—Circular 164.

Illinois Agricultural Experiment Station, Urbana, Illinois—Circular 343.

Agricultural Experiment Station, Purdue University, Lafayette, Indiana—Bulletin 309.

For Apples:

Missouri Agricultural Experiment Station, Columbia, Missouri—Circular 147.

Agricultural Experiment Station, Purdue University, Lafayette, Indiana—Circular 141.

U. S. Department of Agriculture, Washington, D. C.—Bulletin 1457.

About the most satisfactory equipment which you might be able to make and use efficiently would be a sizing board and sizing rings. Where a sizing machine is not in use, the beginner will generally find the use of a sizing board or sizing rings of great value in all packing operations. These devices are cheap and useful in teaching the packer to recognize and sort the various sizes of apples. The experienced packer will also find them of assistance when kept close at hand as an aid in occasionally checking up his work to maintain the proper standard. Sizing rings can usually be obtained at reasonable prices at harness

shops where they are sold as harness rings, while sizing boards may be made at home or procured at carpenter shops. The circular openings of the board and size of the rings should vary from two inches to three and one-fourth inches. A sizing board will be found very useful.

Nitrate of Soda or Sulphate of Ammonia

Will you tell me which fertilizer you consider the best for apple trees in sod, nitrate of soda or sulphate of ammonia? Would like your opinion very much. Trees are eight years and older.—A. W. P., Illinois.

You should find no material difference in the use of either nitrate of soda or sulphate of ammonia in fertilizing your apple trees which are now growing in sod. It is well, however, to keep in mind the fact that nitrate of soda is more readily available than sulphate of ammonia, but on the average the results obtained are approximately the same. It is suggested, therefore, that you buy the commercial fertilizer which you can buy the cheapest, considering the nitrogen content.

Six and two-thirds pounds nitrate of soda contain one pound of nitrogen, while five pounds of sulphate of ammonia contain an equal amount. In applying these substances to fruit trees, therefore, only three-fourths as much sulphate of ammonia as nitrate of soda should be applied.

Jonathan as a Pollinizer for McIntosh

Would Rhode Island Greening be a good cross pollinator for McIntosh, or would Jonathan be better? We are topworking 1200 Ben Davis trees in the spring. Can you give us a little information on this? I thank you.—W. M. P., Michigan.

According to investigations of the Michigan Agricultural Experiment Station and other experiment stations which have dealt with the Rhode Island Greening as a pollinizer for McIntosh, it is the general opinion that the Jonathan is usually a good pollinizer for the McIntosh, while the Rhode Island Greening is a poor one.

According to the investigations of the Michigan Agricultural Experiment Station, Special Bulletin No. 188, March, 1929, Table 1, "Apple Pollination Results—1921 to 1927," the following results were obtained:

Variety Pollinated	Pollen Used	Year	Blossoms Pollinated	Per Cent of Blossoms	Set
McIntosh	Delicious	1927	112	79.5	
McIntosh	Jonathan	1927	146	45.2	
McIntosh	R. I. Greening	1927	121	6.6	
McIntosh	Steele Red	1927	142	45.0	
McIntosh	Wealthy	1927	162	52.5	

From these investigations it can be readily seen that Rhode Island Greening ranks very poor as a pollinizer for McIntosh.

Unfruitfulness of Plum Trees

I have some Green Gage and European plum trees that are old enough to bear fruit but do not. I cannot seem to find out what the trouble is. I prune them and spray them. The trees are big and healthy looking. Do you think I should fertilize the ground, and with what? Do you think wood ashes would be good as a fertilizer? In March I always spray my trees with lime and sulphur. Do you think that has anything to do with it? Last year there were a few plums on the trees but they fell off. What caused this?—J. H., Indiana.

The so-called Green Gage plum with several other European plums (*Prunus domestica*) seem to be self-compatible enough to set satisfactory crops without mixed plantings. No doubt, however, one or more other varieties of European plums would be beneficial in securing a satisfactory set of fruit.

It is not believed that wood ashes would assist materially in increasing the fruit set. It is possible, however, that if the trees have made too much vegetative growth in the past that a slowing down of this might assist materially in securing satisfactory crops.

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Eveready Layerbilt "B" Batteries come in two sizes, the Medium Size No. 485 (price \$2.95) and the Large Size No. 486 (price \$4.25). Eveready Layerbilt construction is unique and is patent-protected. Only Eveready builds Layerbils.

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Here is the inside story about the ordinary 45-volt "B" battery assembled of separate, individually sealed cells. There are 30 independent cells, connected by 29 fine wires and 60 soldered connections—89 chances for trouble. Note the amount of space wasted between cells.

EVEREADY Radio Batteries

The Telephone Increases her egg and poultry Profits

A Bell System Advertisement

THE telephone is used by a farmer's wife near Orleans, Ind., to get the highest prices for eggs. At certain times the prices paid by dealers in her neighborhood vary as much as 15 cents a dozen. By telephoning to a number of them and discovering where the highest price is to be had, she frequently realizes an added weekly profit of \$2 or more. She also finds the telephone profitable in getting orders for eggs to be hatched, and in buying feed and supplies with the greatest saving of time and money.

The telephone also gives valuable aid in getting the highest prices for livestock, grain, fruit and vegetables through co-operative marketing associations or local markets. It can always be depended on to run errands about the countryside, make social engagements, order farm and household supplies and summon help in cases of accident or sickness.

The modern farm home has a telephone that serves well every day of the year, rain or shine.



BOOKLETS OF VALUE

to the commercial fruit grower may be obtained from most advertisers in this issue. These booklets contain dependable information on the more important phases of fruit production. Send for them.

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BLACK LEAF 40
KILLS Poultry LICE
"JUST PAINT" THE ROOSTS



"Black Leaf 40"

THE MONTHLY FRUIT and VEGETABLE REVIEW

By PAUL FROELICH
BUREAU OF AGRICULTURAL ECONOMICS

WITH A MILD WINTER in many parts of the country, it began to appear that carlot supplies of new-crop vegetables would become heavy, earlier than usual. Apples and citrus fruits were very plentiful, and a considerable quantity of pears was still on the market. Strawberry movement from Florida was slowly increasing and was expected to reach its peak by March 1. Combined carlot movement of 27 important fruits and vegetables was averaging close to 17,000 cars each week. In general, output was heavier than a year ago. Markets for most products were sluggish and prices moderate.

Printed copies of the 1931 Agricultural Outlook Report can be had from the Bureau of Agricultural Economics.

Strawberry Acreage Reduced

Total acreage of strawberries for picking in 1931 may be only 156,290 acres, or 11% less than last year and 12% below the five-year average. Most of the decrease is in Arkansas, Missouri, Tennessee, Kentucky, Virginia, Maryland and Delaware. Among the early shipping States, sharp cuts of acreage are noticed in Alabama and Texas. Florida shows a slight increase and Louisiana is almost up to its 1930 level. The five early States together are reported to have 39,100 acres of strawberries for harvesting this season, or 9% less than last year. The second-early group of seven States has 31,730 acres, compared with 42,800 in 1930, a decrease of 26%. The nine intermediate States, together, expect only 41,440 acres this season, or 10% less than in 1930 and 25% below average. A total of 44,020 acres in the 10 late States is about the same as last season and 7% above the five-year average for this group.

Forwardings from the Plant City district of Florida had increased but were still averaging only a dozen cars daily. Movement for the 1929-30 season was exceptionally early, so that output for the current season to February 7 was only about half that of a year ago, but by the end of the 1931 shipping period in April it is expected that the number of cars moved will be almost the same as last year. Companies which put up cold-pack berries are likely to take the tail-end of the Florida crop, when competition from Louisiana becomes serious. During early February, growers around Plant City were receiving approximately 15¢ per pint or 27¢-31¢ per quart. Limited shipments were being made with dry ice as an experiment.

Apple Holdings Heavy

The equivalent of 7,446,000 barrels of apples was still in commercial cold-storage houses in the United States on February 1, which is 23% more than stocks of a year ago and 14% above the five-year average for that month. Holdings of 837,000 barrels were about one-third lighter than those of February 1, 1930, and approximately 60% below the average figure for barrels. The 15,850,000 boxes still under refrigeration at the beginning of February were about 50% more than holdings of a year ago and nearly that much above the average for boxes. Most of the apples in this package were still in Pacific Coast States. Bushel baskets in

cold storage numbered 4,476,000, or only about one-tenth more than last February but approximately 70% more than the five-year average.

Exports this season have been heavy. The International Apple Association reported 8,193,000 barrels and 8,676,500 boxes exported from United States and Canada by the end of January. These figures compare with 2,270,550 barrels and 4,650,450 boxes to the same time last season. Some recent arrivals of barrels on the Liverpool auction have been showing poor condition. Boxes were in generally good condition. Prices were somewhat depressed.

Total shipments of apples from producing sections of the United States were holding close to 1800 cars per week, nearly two-thirds of these coming from western districts. F. o. b. prices of Extra Fancy, medium to large boxed apples in the Pacific Northwest still ranged \$1.15-\$2, according to variety. Bushel tubs in the Rochester district of New York were returning \$1.20-\$1.50. Some apples in storage were beginning to show deterioration. About 92,500 cars had been shipped by February 10, or 5000 more than movement of a year ago.

Citrus Shipments Active

Effect of the heavy production of citrus fruits this season was being seen in the relatively low prices. Shipments were extremely active during January, but a sudden decrease for California oranges occurred during early February. Florida orange shipments were still averaging 200 cars daily, while 140 each day came from California. In view of a city auction average of \$2.95 per box of best Florida oranges and \$2.45 per box of grapefruit, returns to growers were rather discouraging. Movement of Florida grapefruit still registered an average of 135 cars daily, as the Texas season began to wane.

By early February, Florida had shipped one-third more grapefruit than to the same time last season. An interesting experiment with bulk shipments of grapefruit was made in Kansas City, where bulk stock has been put into cabbage crates and jobbed at \$2.50-\$3.50 per 100 fruits. Jacksonville has become an important exporting point for fresh grapefruit and oranges, as well as for canned citrus. Shipments by boat directly to England and Germany have become numerous. Carlot shipments of California oranges by the first week of February were approximately one-fourth heavier than a year ago, but Florida orange movement showed an excess of 50% over that of last season to date. California lemon shipments have been more than double last year's corresponding record.

Southern Vegetables Moving

Increased plantings of southern truck crops were being reflected in the active carlot movement. F. o. b. prices tended downward as the season advanced and supplies became heavier. An exceptionally large crop of spinach was being harvested in southern Texas. The second-early plantings of spinach in Virginia are expected to be increased sharply to 7000 acres, compared with 4000 last year, and Arkansas may have 2100 acres, as against 1500 in 1930. Eight second-early spinach States together

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look for a total of 14,100 acres, or one-third more than last season. Imports of green peas from Mexico were showing fairly heavy volume. The spring season for peas in Imperial Valley and other parts of California will soon be active.

Potato Holdings

Holdings of merchantable potatoes on January 1 in 35 late States together were 88,954,000 bushels, or scarcely 1% less than a year ago. The 19 surplus States which make most of the shipments had 81,370,000 bushels, or about 1% more than their holdings of last season. East and North the holdings are lighter than a year ago, but an excess of 28% appears in the West. The 16 deficient late States have about 15% fewer potatoes than last January.

Shipments from January 1 to February 10 were around 25,000 cars. Daily movement was averaging 700 cars. The entire market situation was rather weak. The f. o. b. level in northern Maine held around \$1.25-\$1.30 per 100 pounds sacked, but prices in western New York declined to \$1.40-\$1.45 and the North Central f. o. b. range was \$1.10-\$1.30 in early February. Most carlot sales in western shipping districts were being made at 75¢-\$1.10 per 100 pounds. The Chicago carlot market was lower on northern Round Whites at \$1.20-\$1.40, with Nebraska Bliss Triumphs selling at \$1.50-\$1.60 and Colorado and Idaho stock at \$1.65-\$1.95. "Futures" on Idaho Russets for March delivery averaged \$1.64 per 100 pounds and for April delivery \$1.74. New southern potatoes were jobbing generally at \$1.90-\$3 per 50-pound sack or \$1.75-\$2.75 per bushel package. Bermuda barrels brought \$8-\$8.50 on the New York market.

Utilization of Potatoes

Of the estimated 324,741,000 bushels of potatoes produced in the 35 late or main-crop States last year, about 64% was estimated to be of U. S. No. 1 grade, compared with 68% in 1929. Nearly 8% was reported to be unfit for either food or seed, which was a considerably larger percentage than for the 1929 crop. About 18% of the crop in these States, or 58,713,000 bushels, was saved by growers for food on their own farms. This is slightly more than was so used from the 1929 crop. The quantity held for local seed requirements was 34,375,000 bushels, or about 11% of the late crop. This also is a little more than was saved for seed from the crop of 1929. Thus a total of 206,193,000 bushels, or 63% of the late crop, remained available for sale at harvest time, but only 88,954,000 bushels of that quantity were still available on January 1. Holdings in Canada on January 1 were 2,837,020 cwt., or nearly 10% less than stocks of a year ago, though production was almost one-fourth heavier than in 1929.

Sweet-Potato Prospects

The 1931 outlook report for sweet potatoes indicates a large increase over last year's light production. Acreage is likely to show its greatest increase in southern States, producing the moist-flesh type of sweet potatoes. Yields in 1931 also are expected to be above the low level of 1930. Material increases of acreage are not expected in the eastern States, producing the dry-flesh type of sweet potatoes. Competition from Irish potatoes may be greater during 1931 than in 1930. Recent shipments have been very light, averaging only 40 cars daily in early February, one-third of these being from Tennessee. Bushel packages showed a wide range

of \$1.25-\$2.75 in city markets, depending on variety, source and pack.

Lettuce Acreage Reduced

A slight decrease appears certain in acreage of spring lettuce. Arizona spring crop may be reduced to 18,000 acres, as against 19,000 last year, and California expects 30,850 acres. North Carolina looks for the same area in this crop as last season, but South Carolina a slight increase. Total for the four sections may be 50,800 acres, or 3% below the 1930 figure. Rains during early February caused considerable damage to the Imperial Valley crop and held down shipments to a daily average of 175 cars. Cash-track prices had advanced to a range of \$1.25-\$1.55 per crate, but later declined to \$1-\$1.25. Subsequently, the price advanced to \$1.75-\$2.75. The 1½-bushel hampers of Big Boston lettuce from Florida were jobbing in city markets at a wide range of \$1-\$1.75, as against Iceberg-type from the West at \$2.25-\$3.75 per crate. The rapidly-increasing acreage and production of lettuce, particularly in the West, suggests that caution be observed regarding further material increases of this crop.

Tomato Movement Increasing

Growers are warned against any increase of tomato acreage during 1931, because of the possibility of heavier or more-normal yields than last year. South Florida has an estimated 11,100 acres of tomatoes, or nearly as many as last season. Much of the original acreage was lost by bad weather. Planting intentions for other parts of Florida, which ship later, are for a decrease to 15,000 acres, compared with 19,000 last year. The lower valley of Texas, however, expects a decided increase to 11,860 acres, and Imperial Valley of California a sharp increase to 1600 acres. Total for these three sections is a little below last season's figure. Florida shipments were still moderate, averaging only about 10 cars daily. Mexican imports were increasing, and recent total imports from three countries were 30 cars per day. F. o. b. sales of six-basket crates of fancy-count stock at southern Florida points were being made at the higher level of \$2.25-\$3.75, with lug boxes returning \$1.75-\$2.25. Quality was improving but still is below par. Best sixes in terminal markets, whether from Florida or Cuba, were jobbing at \$2.50-\$6.50 and lugs from Mexico ranged \$3.75-\$4.50, with a few sales higher.

PAMPHLET ON ORCHARD MANAGEMENT

MUCH general information on the management of orchards is presented in a brief, popular publication prepared by Dr. U. P. Hedrick, Director of the New York State Experiment Station at Geneva. The pamphlet, known as Circular 52 and available free of charge to anyone interested in the subject, deals with apples, pears, peaches, cherries, plums, and quinces.

"The management of an orchard is not a matter to be settled by one man for another," says Dr. Hedrick in introducing his subject. "To tell a man exactly how to grow fruit is impossible. But there are fundamentals in fruit growing as in all professions and these can be set forth. To call attention briefly to some of the fundamentals of orchard management is the office of this circular."

Dr. Hedrick then takes up in turn the topics of location of the orchard, orchard plans, selection and planting of the trees, cultivation, etc.

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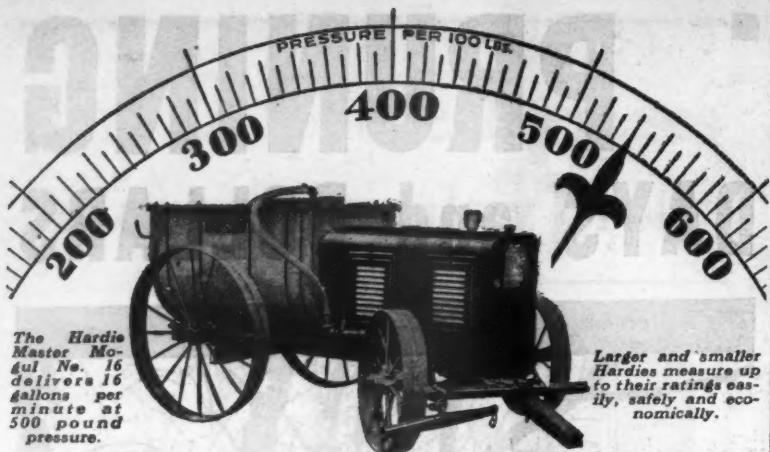
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THE FUTURE OF FRUIT WASHING IN THE EAST

By WILLIAM ABILDGAARD

AS PART of the problem of fruit washing is the removal of excessive spray residue, the logical place for first consideration of this is in the spray program itself. The United States Department of Agriculture and various State experiment stations have worked out spray schedules and recommendations especially adapted to the conditions in the different sections, and this information is made available through the extension authorities, and, in some cases, a special spray service is in operation. There is plenty of evidence to indicate that the growers following those recommendations most closely are the ones coming through the season with the smallest losses from insects and diseases and with the best finish on their fruit. Most of these authorities are advising their growers to continue the established practices in spraying, using safe amounts of material and applying them with care and thoroughness.

Careful, thorough spraying will not only bring best control of pests but will simplify the residue problem. The fruit most difficult to properly clean is that subjected to splotchy, spatter spraying.

Types of Washers for the East

Fortunately, the 1930 season gave opportunity to study several different types of both commercial and home-made washers in use under eastern conditions. Since the spray residue removal is only one part of all the residue to be removed, the paddle and flotation type of washers does not seem to be well adapted to eastern conditions. In most cases, insufficient provision for rinsing has been made in these home-made types of washers and in no case have effective dryers been provided.

for commercial handling conditions. No doubt as more washing equipment is installed in the East, the individual units will not be so overloaded, and a better understanding of all washing methods will bring improvements in this respect.

The commercial washer using the flood type of applying the washing solution provides for constant turning of the fruit, exposing all surfaces to the large quantity of washing solution applied from the top only. This type of washing seems effective in not only removing the arsenate and lead residues, but in loosening the residue of lime-sulphur and Bordeaux mixtures, so that they are effectively removed in the rinse and drying sections.

Insect Residues of the East

The humid conditions of the East favor the development of the different kinds of aphids on apples and psylla on pears. In seasons of damp springs and summers, in spite of the ordinary control measures, these insects build up to damaging proportions, and their excretions of honeydew become serious on susceptible varieties. The black fungus which grows in these excretions completes the disfigurement of the fruit and causes it to grade down at harvest time. In dry seasons, such as 1930, the leaf hoppers affecting apples become extremely abundant, and the fruit is badly disfigured with the excrement from these small insects.

These several insect residues enter into the cleaning program for the East to much greater extent than in the West. The experience of 1930 showed that these residues along with those left from spray material could be satisfactorily removed in this latter type of washer using the flood



Washing fruit in Michigan Fruit Growers' packing house, Benton Harbor, Mich.

The commercial washers in use in the East are of two general types—the diffused spray principle of washing combined with air dryer and the flood type of washing combined with the absorbent towel drying principle. A brief discussion of these two models and their adaptations to eastern conditions would seem timely.

In the diffused spray type, the fruit is conveyed through a continuous spray of the washing solution on an endless conveyor, the fruit remaining stationary and the washing material being pumped onto the fruit under pressure both from above and below the conveyor. This type has the advantage of being capable of much overloading of its rated capacity. Under 1930 conditions, effective removal of arsenical residue was accomplished even when so overloaded. The drying under these overloaded conditions was not so thorough but generally conceded satisfactory

principle of washing together with the towel type of dryer.

Dryers

The air type of dryer used with the diffused spray type of washer is designed to actually blow the drops of rinse water from the fruit as it lays stationary on the conveyor. Under ordinary atmospheric conditions, this dryer is very effective. With the absorbent towel type of dryer as used with the flood type of washer, the drying depends on the actual absorption of water from the fruit by the toweling material as the fruit turns and passes under the towels, which are constantly being wrung out by a wringer attached to the machine. These towels complete the removal of the Bordeaux, lime and sulphur and the insect residues. The towels are wet with fresh rinse water constantly, and this rinsing process keeps them clean and in a condition for

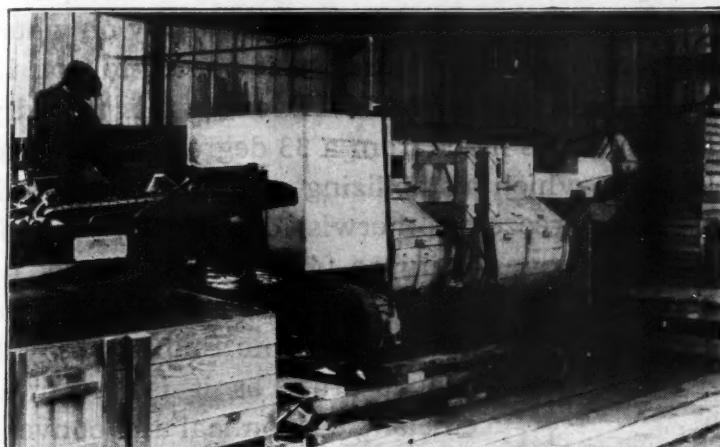
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both satisfactorily drying and polishing the fruit. Velour, the same material as used for automobile upholstery, is now being used in these drying units, serving the double purpose of drying the fruit and imparting a final polish to it. The fruit then passes onto the receiving end of the grader. Indications are that the drying operation will be of even more importance in the eastern sections than in the West, because of the prevalence of apple scab. In lots of fruit carrying even slight infections of scab as it goes into the shipping package and then into the storage plant, this factor of moisture may be of prime importance.

Commercial washers are now available in several sizes for different packing requirements. As a larger part of the eastern fruit production is handled by the individual grower, no doubt the grower's model will be more generally used in the East than has been the case in the Pacific Northwest. Experiment station and extension workers have pointed out to the manufacturers this need of a grower's model and this model will be produced this year for eastern conditions.

Installation and Operation of Washers

Installation of washing equipment



Installation of grower's model of fruit washer in the packing house of Wagner Brothers, Easton, Pa., in 1928 for removing cement dust from apples.

where water is available for rinsing is no more difficult than the installation of any other packing house unit. The washer is placed ahead of the grader, sometimes right on the receiving platform of the packing shed. The fruit is emptied onto the washer and passes automatically onto the receiving end of the grader, no extra labor being required in this connection. If electric power is available, this is usually the most satisfactory for washer operation. Where electric power is not to be had, gasoline engines or tractors furnish satisfactory power units.

Rinse water should be provided at the rate of two to three gallons for each bushel of fruit to be washed. This requirement is usually not in excess of the ordinary farm water supply and is a small item where water from a town supply is available. It is not necessary to have this water supply under pressure, but this adds to the effectiveness of rinsing. Pumps are supplied in the washer unit for recirculating the rinse water. The direct water supply furnishes the final rinse just as the fruit leaves the rinsing section.

The extension authorities in the different States will advise the proper strength of acid solution for the different amounts of residue to be removed. Under most conditions from one-half to one per cent of actual acid has proved sufficient for eastern

conditions. Extreme cases may require solutions above these figures. It is important to watch the acid strength closely, especially if the fruit is wet as it is fed into the washer, also to determine if the residue contains lime, as it seems lime neutralizes the acid solution to some extent. Simple apparatus, which can be had at small cost, is available for testing the strength of the solution. Additions of acid solution are necessary from time to time to make up for the acid that passes into the rinse section from the fruit. The acid section of the washer should be drained and flushed out each day and a new washing solution made up for the next day's run. The drainage from the washer should not go into a stream populated with fish. Careful attention should be given to the supply of rinse water to see that it is adequate at all times. The drying unit should be kept in condition to operate at its maximum efficiency.

Ordinarily the packing house manager can supervise the washing operation in connection with his other duties. In smaller operations the individual responsible for the packing should give his close supervision to the washing. The mixing of materials for fruit washing is of equal importance to that of mixing materials for spraying, and carelessness

in this respect may cause the same unfavorable results.

Cost of Washing

Several hundred thousand bushels of apples were washed in the eastern section in 1930 at costs varying from one cent per bushel to several cents. The manager of the Fennville, Mich., packing house, operating two warehouse models of washers in the 1930 season, reports that on their volume the total cost figured at just one cent per bushel. In a large co-operative packing house in southern Illinois, 100,000 bushels were washed through one warehouse model at a total cost of one and one-half cents per bushel. As in other orchard and packing house operations, the cost of washing depends on the volume of fruit handled, the efficiency with which labor is handled, and many other factors. Under conditions where 100,000 bushels or more are handled through one washer, the cost should not exceed one and one-half cents per bushel, including materials, labor, power, water, depreciation and interest on investment. The cost of washing in smaller quantities will vary from this figure to several cents per bushel where the volume is limited. In large operations much of this cost is saved in the speeding up of the sorting operations by having the fruit clean and bright so that the blemishes are quickly and easily detected.

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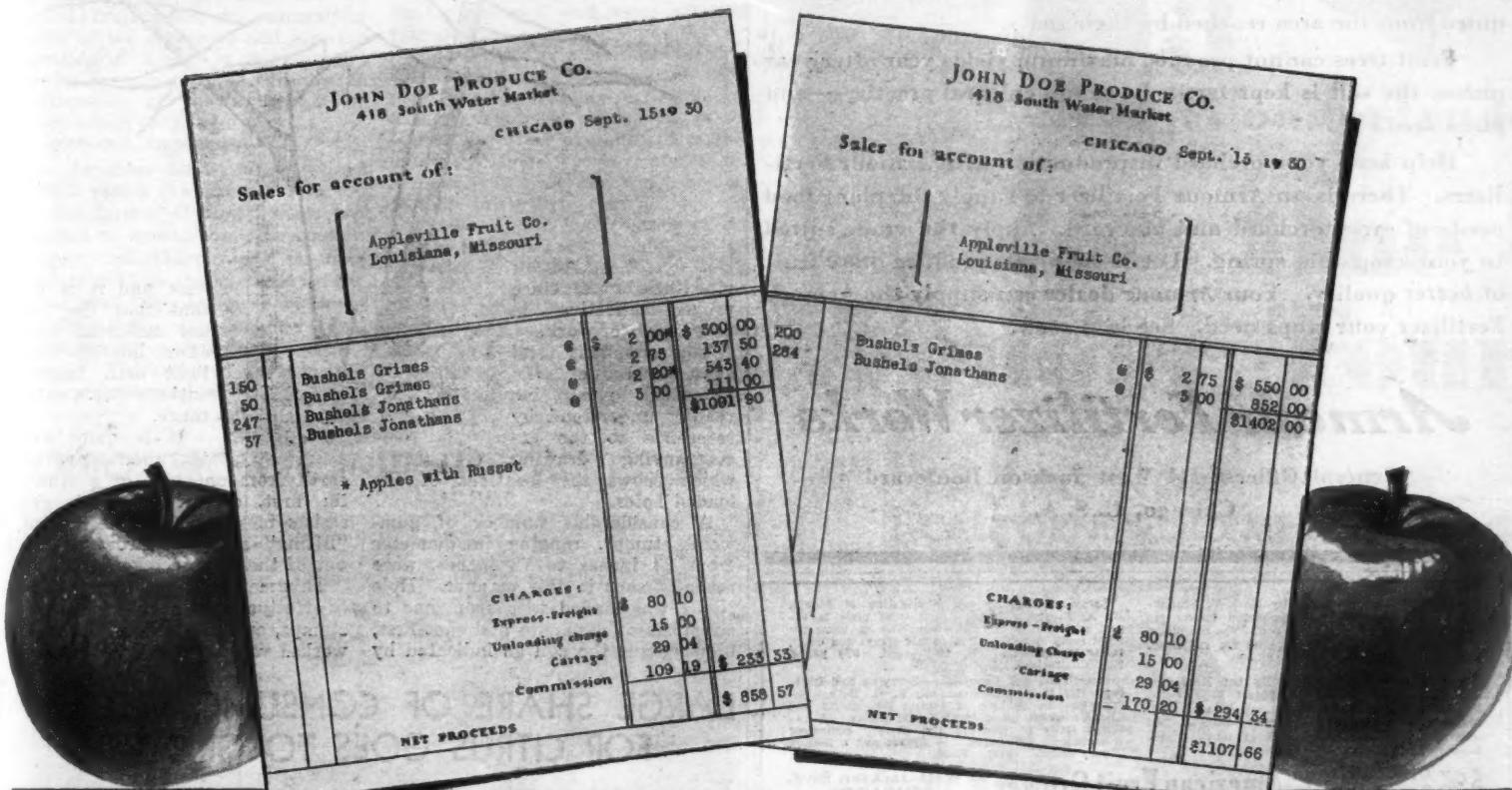
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Sulfur
5-lbs. Hydrated Lime
TO 50-gallons of water

For the After-Bloom Applications:

1½-lbs. S-W Dry
Lime Sulfur
5-lbs. Hydrated Lime
TO 50-gallons of water

Russet Loss

\$249.09!

NO RUSSET IN THIS CAR

MULSOID SULFUR

Peach growers praise this new Sherwin-Williams product. It prevents brown rot and scab. Mixes easily and evenly in water.

FREE MULSION

Highly concentrated, soapless oil-emulsion for the control of San Jose scale, Apple Tree Leaf Roller, European Red Mite and Pear Psylla.

ZINC SULFATE

Use Sherwin-Williams Zinc Sulfate for the control of Bacterial Shot Hole on peaches. Conveniently packed in 100-lb. bags. Write us for further information on these products.



The world's largest and most complete line of insecticides and fungicides sold under this trade-mark.

SPRAY AND DUST MATERIALS

AN orchard like any other crop ... needs fertilizer

AN orchard cannot be rotated to give the soil a change and a rest. Each year your trees must get the plant food they require from the area reached by their roots.

Fruit trees cannot produce maximum yields year after year unless the soil is kept fertile by sound cultural practices—and plant food.

Help keep your orchard in production with Armour Fertilizers. There is an Armour Fertilizer to supply the plant food needs of every orchard and vineyard. Apply the grade suited to your crop this spring. Let it help you produce more fruit of better quality. Your Armour dealer can supply the Armour Fertilizer your crops need. See him soon.

Armour Fertilizer Works

General Offices: 111 West Jackson Boulevard
Chicago, U. S. A.

Manual of Fruit Insects. By Mark V. Sligerland and C. R. Crosby. Nearly 200 insects are named under the fruit they attack. The usefulness of 13 different types of insecticides are explained. 503 pages. 396 illustrations. \$3.50.

Manual of Fruit Diseases. By Lex R. Henler and Herbert H. Whetzel. At least 75% of the loss to fruit crops from disease can be prevented. This manual tells how to identify diseases and tells the most effective methods of control. 462 pages. 136 illustrations. \$3.50.

5% DISCOUNT on 2 or more books American Fruit Grower 53 West Jackson Blvd. CHICAGO

WIN \$2500.00

Yes, I mean it. Others have and now you can. I have hit upon a "crazy" scheme to get advertising and publicity by giving thousands of dollars worth of valuable prizes. I am going to spend over \$100,000.00 on advertising this year and if you haven't yet won one of the prizes in our liberal campaigns there was never a better opportunity for you than there is this time. In this one offer I am going to distribute dozens of valuable and desirable prizes, including prizes of \$2,500.00, \$1,100.00, \$1,000.00, \$900.00 and \$500.00 cash or brand new latest model 1931 sedans, if preferred.

**CAN YOU MAKE UP 20 WORDS?
GET HIGHEST PUZZLE SCORE!**

You will notice the drawing at the right is made up entirely of letters. The outline of the face is "O," the hat is "A," etc. There are 14 letters altogether. Find these letters and write them down. Then use combinations of them to spell out words. 20 words are required for a correct answer and this number will give you the highest score given for this test. I know your eye immediately hits on several words such as "hat," "gun," "son," etc. These are all good acceptable words and you may include them in your list. Each letter in the drawing may be used as many times as you wish, but no letters that do not appear may be used.

\$2500.00 to you if you get 20 correct words and are prompt and win first prize; or, if you prefer, a latest model 2-cylinder Studebaker, four-door Sedan and \$715.00 cash.

\$715.00 ADDITIONAL FOR PROMPTNESS

makes the total first prize you can win \$2500.00. Nothing to buy now, later or ever. Just send your list of words in a letter or on a post card. That's all. No obligation. If correct, you will be qualified for this opportunity. Duplicate prizes in case of ties. Persons living in Chicago and outside the U. S. A. not eligible.

T. A. HUGHES, Adv. Mgr., Dept. 19, 500 N. Dearborn St., Chicago, Ill.

\$7800.00

**in prizes!
this time!**

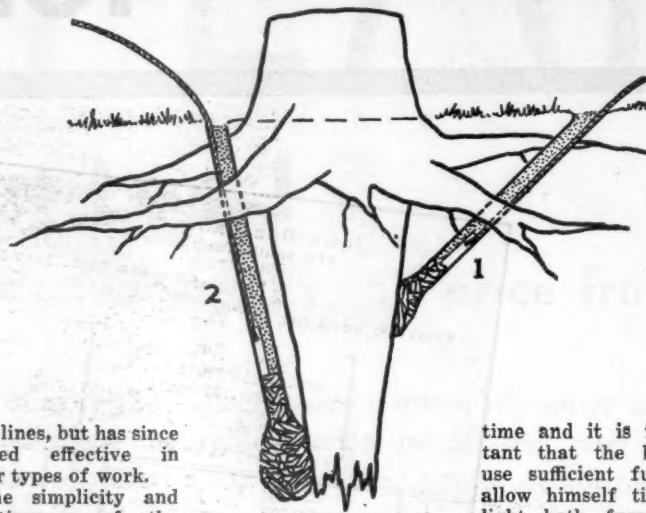
BLASTING TAP-ROOTED STUMPS

A RADICALLY different method for shooting tap-rooted stumps has recently been developed.

This method speeds up the removal of this type of stump, especially in sandy soil. It was originally developed for clearing right-of-way for

the dotted line. Hole No. 2 was loaded with from 12 to 56 sticks of dynamite and shot next. The proper timing of the shots was controlled by the use of a longer length of fuse for the second hole.

Both fuses are lighted at the same



pipe lines, but has since proved effective in other types of work.

The simplicity and effectiveness of the procedure may be readily understood by reference to the accompanying drawing which shows the locations of the loaded holes.

A considerable number of gumwood stumps, ranging in diameter from 24 inches to 72 inches, were recently shot in this manner. Hole No. 1 was loaded with from one to six sticks of dynamite and shot first, blowing out the soil as indicated by

Diagram showing position of charges in this new method of blasting tap-rooted stumps.

time and it is important that the blaster use sufficient fuse to allow himself time to light both fuses and withdraw to a safe distance.

It is quite evident that the removal of the earth from one side of a stump by the first, or "relief" shot, greatly assists in permitting the second, or "lifting" shot, to throw the stump out of the ground.

This method of blasting is especially effectual in removing southern pine stumps, and as previously stated, has worked very successfully in sand.

LARGE SHARE OF CONSUMER'S DOLLAR FOR CITRUS GOES TO GROWERS

THE CALIFORNIA citrus grower receives a higher proportion of the consumer's dollar than any other large perishable producer, according to studies made by the California Fruit Growers' Exchange. This organization now markets 77.7 per cent of the 60,000-carload California citrus crop under the well known Sun-kist standard.

Breaking down the dollar which the American consumer spends for oranges, the exchange has found that the grower receives 38.6 per cent for his fruit on the trees. Other segments of the dollar are taken as follows: picking and hauling, 2.2 per cent; packing, seven per cent; selling and advertising, 1.5 per cent; transportation, 16.4 per cent; jobbers' margin, seven per cent, and retailers' margin, 27.3 per cent.

Twenty-three years of national consumer advertising, during which time a total of \$13,000,000 has been spent, together with proper distribution through co-operation between growers, has made it possible for the exchange to establish this enviable merchandizing record in the handling of oranges. The cumulative effect of the long time advertising program is having full influence at the present time; low selling costs have increased exchange membership to 12,500 growers, resulting in stronger control in distribution.

Cortland possesses most of the good qualities of the McIntosh parent and in addition ships and handles better. It is important commercially, however, for prolonging the season of the McIntosh type of apple, as it can be put on the market in January when McIntosh is beginning to decline in quality. Also, it is an annual bearer, is an excellent pollinator, and hangs to the tree better than does McIntosh.

CORTLAND APPLE MAKES GOOD

OF THE forty-odd new varieties of fruit developed by the fruit breeders at the New York State Experiment Station at Geneva and now being grown commercially, perhaps the best known is the Cortland apple, for it has made good beyond question. Originating from a cross between McIntosh and Ben Davis made on the Station grounds in 1898, Cortland first fruited at Geneva in 1906, but was not distributed for trial until 1915. Since then its popularity has grown rapidly, until it is now an accepted commercial variety to supplement McIntosh and prolong the season of that high-quality apple.

Cortland possesses most of the good qualities of the McIntosh parent and in addition ships and handles better. It is important commercially, however, for prolonging the season of the McIntosh type of apple, as it can be put on the market in January when McIntosh is beginning to decline in quality. Also, it is an annual bearer, is an excellent pollinator, and hangs to the tree better than does McIntosh.

DR. MARLATT REPORTS ON PEST CAMPAIGNS

FEDERAL entomologists are working in seven foreign countries, as well as in the United States, Alaska, Hawaii, and the Canal Zone, says Dr. C. L. Marlatt, Chief of the Bureau of Entomology, in his annual report, covering the year ended June 30, 1930.

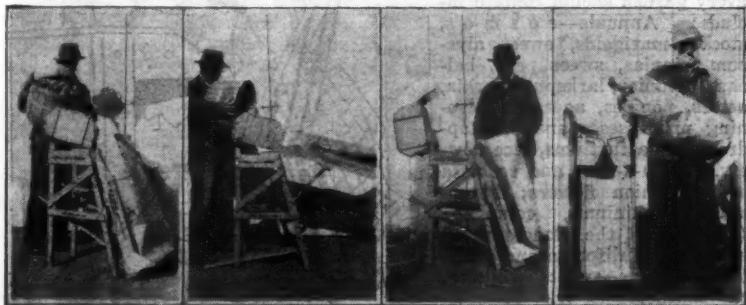
The bureau's activities in the continental United States ranged from active research in the field of controls for the more spectacular insect pests such as the Japanese beetle, the European corn borer, the Mediterranean fruit fly, the gipsy moth, and the oriental fruit moth, to painstaking studies of the enormous and growing collections of insects in the National Museum for the purpose of accurate identification of the thousands of species which may have a greater or less economic importance.

The Japanese beetle, which was so severe a pest a few years ago in the Riverton section of New Jersey, has continued to spread into surrounding territory, but observations in 1929 served to confirm the bureau's earlier opinion that "the Japanese beetle is decreasing in the older occupied areas and increasing in those more recently invaded." The research work on this pest includes continuing studies of its

biology and habits, experiments with insecticides which will kill the beetle grubs in the soil where this insect spends 10 months of its life, experiments with baits and repellents, trapping, parasite introduction, and the transfer to new areas of parasites which have established themselves in areas where they were introduced in previous years. The bureau is now able to recommend the use of lead arsenate to control injury to lawns and golf greens, and it is experimenting with other poisons in hopes of finding cheaper and more effective preparations.

Among the new activities which the bureau undertook in the last fiscal year were the breeding in New Jersey and distribution to other parts of the United States of parasites of certain important native insects related to the oriental fruit moth and which are becoming important controls of the latter insect; the investigation of the strawberry root aphid; collection of parasites of the Mexican bean beetle in Mexico; investigation of the leaf hoppers believed to be responsible for a widespread malady affecting alfalfa, clover, and other legumes; and importation of a parasite of the pink bollworm of cotton.

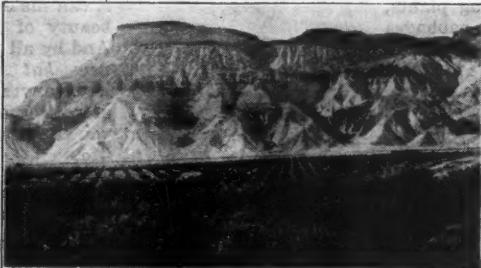
OHIO GROWER INVENTS BAG FILLER



A HANDY DEVICE for transferring a bushel of apples or potatoes from a basket into a paper sack, the invention of Leo H. Dietsch, of Edgerton, Ohio, has been exhibited at many of the winter horticultural shows by his brother, B. Franklin Dietsch, of the same place, who, it will be remembered by readers of AMERICAN FRUIT GROWER, was the author of the article in the issue of April, 1928, on "The Dietsch System of Pruning."

The growing popularity of the bushel paper sack as a package for use at roadside stands has created a problem of filling the sack without bruising the apples or "scoffing" the potatoes. By the ingenious arrangement of Mr. Dietsch's machine, the sack is clamped into place and raised to a position from whence the apples can be poured from the basket down a gentle slope into the sack, as shown in the pictures above.

AN INTERESTING ORCHARD SCENE



THE IRRIGATED valleys around Grand Junction, Colo., in the western part of that State, are noted for fruit production, especially peaches. In this picture is seen peach orchard area on the road from Grand Junction to the Grand Mesa National Forest. A great many tourists travel through

this part of the west to see the Colorado National Monument, the desert and mountain scenery. Many of them say the orchards ought to be ranked as a major attraction. This picture was taken near the town of Palisade. Mt. Garfield is shown in the background.—David I. Day, Indiana.



3 Wonderlands in One Wonder Tour

Low Cost All-Expense

PACIFIC NORTHWEST CALIFORNIA-OLD MEXICO

Sponsored by



and The American Fruit Grower

GO NEXT July with family, congenial friends and experienced escorts. All the West's thrills concentrated for you in 16 days of de luxe adventuring at a minimum cost.

This master tour includes a Sioux Indian ceremonial, Seattle, Tacoma, Puget Sound, Mt. Rainier National Park and its glaciers, Portland, Columbia River Gorge, Oakland, San Francisco, Chinatown, Monterey, Carmel, Old Missions, Los Angeles, Hollywood, Riverside, the Beaches, Catalina Island, El Paso, Old Mexico. Stopovers and complete sightseeing arranged by specialists at these famous places.

And in addition, you'll enjoy escorted visits to the West's greatest fruit districts: Yakima, Hood River and Rogue River Valleys, California's Orange Empire, Imperial Valley's sub-tropic gardens.

Luxurious Special Trains, selected hotels, delicious meals—everything to make this tour the best ever run—have been arranged. One price, paid in advance, covers every necessary expense. It's the year's great travel opportunity. Tour leaves Chicago via The Milwaukee Road, July 18. Let us tell you more about it.

Mail This Coupon at Once

Wonder Tour Editor, American Fruit Grower Magazine
53 W. Jackson Blvd., Chicago, Ill.

Without obligation, please send me complete information about the Wonder Tour of the West, including cost.

Name.....

R. F. D. City State

Irrigated Fruit Farms Pay Moses Lake, Washington

Twenty acres enough. Men with little money can get irrigated farm homes yielding large crops of apples, pears, peaches, cherries, apricots, strawberries, melons, alfalfa, potatoes, vegetables. Long growing season, early markets mean higher prices. Climate, surroundings favor health, comfort, contentment. Most advantages, least disadvantages for irrigated section. 9,000 acres in Columbia Basin, Central Washington—low prices—low taxes—unfailing water supply pumped by cheap electric power—no joint liability. Unimproved lands at \$25 to \$75 per acre; easy payments.

Write—all questions reliably answered. No obligation. The Milwaukee Road recommends only proven lands, helps settlers with advice. R. W. Reynolds, Commissioner, The Milwaukee Road, 925-H Union Station, Chicago, Illinois.

SARFF'S BERRY PLANTS
Trees and Ornamentals
Raspberries
LATHAM-CHIEF-VIKING
NEW LOGAN BLACKCAP
(Resistant to mosaic)
ALFRED BLACKBERRY
BLAKEMORE STRAWBERRY
RED ROME BEAUTY APPLE
These outstanding New Varieties fully described in our Catalog which is free on request.

W.N.SARFF'S SONS, BOX 10, New Carlisle, O.

20 GIANT ZINNIAS 10c

Send for World's Greatest Collection of Giant Zinnias—famous for size and beautiful colors—easy to grow everywhere and bloom from early summer until frost. This collection includes 20 gorgeous colors, as follows:

Bright Rose	Purple	Shrimp Pink
Burnt Orange	Sulphur Yellow	Cardinal
Deep Flesh	Salmon Rose	Canary Yellow
Lavender	Buttercup	Blush Pink
Blue	Yellow	White
Ruby Red	Crimson	And Others
Orange	Deep Rose	

These Seeds—20 Colors in pkts. (over 100 seeds), 10c; 3 pkts., 25c; 8 pkts., 50c; 20 pkts., \$1.00. Spring Catalog (235 varieties in natural colors) of Seeds, Bulbs, Shrubs, Roses and Perennials, sent with every order or free on request. F.B. MILLS Seed Grower, Box 60, Rose Hill, N.Y.

Earliest Tomato

Nothing earlier to be had anywhere. Regular price 15c per pkt. but to introduce Jung's Quality Seeds will send a pkt. of this Tomato and Cucumber, Carrot, Lettuce, Onion, Radish, Superb Asters, Garden Pinks, Giant Zinnias and Ruffled Giant Sweet Peas if you will enclose 10c coin to pay postage and packing. A coupon entitling you to 10c worth of seeds FREE free with each catalog. Catalog free. Send for FREE colored catalog full of bargains in seeds, plants and shrubs and is sent free. Many new seeds free.

J. W. JUNG SEED CO., Farm 7, RANDOLPH, WIS.

KINKADE GARDEN TRACTOR

and Power Lawnmower

A Practical, Proven Power Cultivator for Gardeners, Fruit Growers, Truckers, Florists, Nurseriesmen, Supermarkets, Counter Estators and Poultrymen.

Low Price—Easy Terms
AMERICAN FARM MACHINE CO.
1165, 33rd Ave., S.E., Minneapolis, Minn.



PULLETS - CHICKS

Egg-Bred, Certified Stocks with pedigree, pure-bred, hardy and most profitable. For sale by chicks, eggs, incubators; reduced prices. Largest stock Est. 1893. Valuable 100 page poultry book FREE. B. F. NEUBERT Co., Box 136, Mankato, Minn.

HOTEL ATLANTIC

450
Rooms

\$2
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FAMOUS for
GERMAN
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SEND FOR
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Most centrally located
on Clark Street, Jackson
One block from LaSalle
St. Station, Post Office
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ERNEST ROESSLER
FREDERICK TEICH
Managing Directors

CHICAGO

CHATS WITH THE FRUIT GROWER'S WIFE

By HAZEL BURSELL



In the Pacific Coast and southern States, however, they can be successfully started in unsheltered seedbeds, preferably in a sunny location in the garden.

Seedbed Prepared

For this purpose a small area should be spaded, raked and well pulverized, then wood ashes and dry, well-rotted manure in liberal quantities should be added and mixed in thoroughly. (Fertilizer which has been kiln-dried to kill seed weeds would prove advantageous.) The seeds may then be scattered thickly broadcast, each variety in a certain limited section of the seed bed, with small stakes to mark the section limits, the seeds covered lightly with fine soil, and the soil patted down lightly. Sunshine and rain will do the rest, except for possible weedings, hand cultivation and occasional waterings with a fine sprinkler. In the case of seeds which are slow or difficult to germinate, a piece of burlap may be spread over the seedbed to retain the moisture. This must be removed just as soon as the seeds have sprouted. As soon as the young plants are large enough, they should be transplanted to their permanent locations.

Some of the flowers which every garden should contain include: Annuals—osmos, stocks, marigolds, sweet alyssum, zinnias, sweet peas, balsam, petunias, larkspur, clarkia, asters, poppies, ageratum, evening primroses, pansies, snapdragons, nasturtiums, lace flowers, love-in-a-mist and scabiosa or pincushion flowers; Perennials—delphiniums, columbine (preferably the long-spurred varieties), California and oriental poppies, sweet williams, chrysanthemums, iris, Michaelmas daisy, shasta daisy, wall flowers, hollyhocks, peonies, sweet rocket, anemones, and baby's breath (some of these, including Michaelmas and shasta daisy, peonies, iris, anemones and baby's breath grow most readily from roots); Biennials—Canterbury bells and fox gloves.

Space will not permit a discussion of any farm vegetable garden in this department, except that we may mention in passing that early peas, onions, carrots and cabbages may be planted as soon as the ground is workable, and that the same hotbeds and special seedbeds that are used for flowers may be used to provide young plants, such as onions, cabbages and tomatoes, for later transplanting to the vegetable garden.

Spring Wardrobe Plans

March, immediately preceding the Easter season as it does, is the ideal time to plan the spring and summer wardrobe for the entire family—especially for the feminine members. The first step is to sort over the garments left from last season to determine which can be used again "as is" except for cleaning and

pressing and minor repairs, which can be remodeled into newer and more interesting styles, and which articles of apparel must be replaced. List and classify all useful articles in the wardrobe of each person.

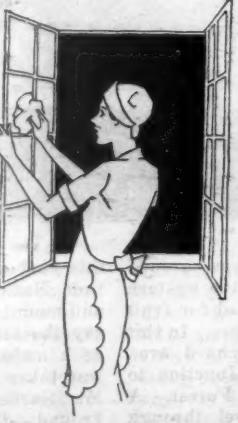
Then study fashion forecasts to ascertain the important new style characteristics, with special attention to the ideas which may be suitable and becoming to yourself or other member of the family under consideration. If possible, go to some of the good department stores or well-patronized apparel shops and study the new garments for useful ideas. Determine the general color scheme, confining the coat, hat and accessories to one becoming neutral shade, such as tan or gray or black, and using one or more interesting and becoming bright colors for accent in each costume. Thus, your coat, hat, gloves, shoes, hose, etc., will harmonize with all your costumes, even though each costume may be different from all the others. Remember, however, that it is much more economical and satis-



factory to have one costume complete in every detail down to the last accessory, than to possess several dresses without the proper accessories to go with them.

When the lists are complete, you may proceed to make the necessary purchases of patterns and materials or ready-made garments and begin to assemble the one or more complete costumes that are necessary for each member of the family. One more thought in passing—give your very best attention to the selection of your hat, for it can not only make or mar your entire costume, but it can make or mar your beauty of face as well. And by all means have a new hat whether you have anything else new or not. It alone can give you a new outlook on life.

Make New Curtains



The annual spring house rejuvenation and house cleaning can be planned and much preliminary work done during this "in-between" period. The actual housecleaning, of course, should be put off until the weather is settled, so that your hard labor

may be returned in the renewed mind and brightened dull woodwork, new, light enamel of one bright new window.

2 c. boiling water
1 lemon, grated

Wash
stew un
Press p
sugar an
Cool, ad
freeze to
egg whi
Pack an

2 oranges
2 bananas
½ c. sh
cocoan

Cut o
a sharp
the slices
powdere
amount
Serve co
sherbet c

1 c. sour
½ c. butte
2 eggs
2 c. sugar
½ t. soda

Cream
soda in s
ture, add
well. St
just enou
dough. A
in desired
and bake

Grind
and nuts
Moisten
between
butter ma
with good

2 beaten e
1½ c. sugar
1 c. sour c
2 c. flour
¼ t. salt
½ t. cinna
½ t. nutme

Mix the
the cream
the soda,
bene with
sifted toge
improved

may not be immediately undone. But you can plan for and make any needed new curtains, pillows, slip covers and cushions which may be useful and ornamental in freshening your home after the long, dark winter. Shabby chairs, tables, desks, kitchen furniture and bedroom pieces may be made all new and interesting by the use of several coats of suitable paint, brushing lacquer or enamel. If you want to do something which will give you unbelievable returns on your money investment in the form of renewed peace of mind and enjoyment of life—just brighten up your dull dark kitchen woodwork, with new, lovely-colored enamel and touches of one or more bright colors, add new wallpaper or calamine as the case may be, a few new gayly bordered linen towels and painted jars and wall shelves, and finally fluffy, crisp new curtains at the windows! Try it



and see what a transformation results!

Repair Old Furniture

An inventory of all furniture needing attention should be taken, with notations for refinishing, repairing, new upholstery, new cushions, etc., as the case may be. Those hopelessly out of repair should be discarded and replaced with other pieces, even though you can afford only inexpensive unfinished articles that can be painted at home. In selecting new pieces, be sure that they are comfortable, smooth in finish, reasonably free from defects, substantial in construction, and that the general style is good. Any of these changes which can be completed before the period of actual housecleaning begins will mean just so much time gained.

Once you have tried the "planning-in-advance" system you will never want to go back to the old way.

RECIPES

Peach Sherbet

2 c. boiling water 1 c. sugar
1 lemon, juice and 2 egg whites
grated rind 2 c. dried peaches
Wash peaches, soak several hours, stew until tender in same water. Press peaches through sieve. Boil sugar and water together 5 minutes. Cool, add lemon and peach pulp and freeze to mush. Add 2 stiffly beaten egg whites and freeze until firm. Pack and let stand 2 hours or more.

Orange Cup

2 oranges 1/2 c. powdered sugar
2 bananas sugar
1/2 c. shredded 1/2 c. grated pine-
cocoanut apple

Cut oranges in small pieces with a sharp knife, and slice and quarter the slices of banana. Mix fruit, add powdered sugar and cocoanut. This amount will serve about 5 persons. Serve cold in cocktail glasses or sherbet cups.

Cream Sugar Cookies

1 c. sour cream 1 t. baking powder
1/2 c. butter 1 T. vanilla
2 eggs Flour
2 c. sugar Grated orange
1/2 t. soda peel

Cream butter and sugar, dissolve soda in sour cream, add to first mixture, add well beaten eggs and blend well. Sift in baking powder and just enough flour to make a soft dough. Add flavorings, roll thin, cut in desired shapes, sprinkle with sugar and bake in hot oven.

Fruit Sandwiches

Grind together figs, dates, raisins and nuts in any desired proportion. Moisten with cream and spread between thin buttered bread. Peanut butter may be added to the mixture with good results.

Sour Cream Patties

2 beaten eggs 1/4 t. cloves
1/2 c. sugar 1 t. baking powder
1 c. sour cream 1/2 t. soda
2 c. flour 1 c. chopped dates
1/2 t. salt and nuts
1/2 t. cinnamon Cocoa to color
1/2 t. nutmeg

Mix the beaten eggs and sugar, add the cream blended thoroughly with the soda, beat thoroughly and combine with other dry ingredients, sifted together. The flavor will be improved by the addition of 1 t.

vanilla and about 1 t. grated orange peel. Add the dates and nuts, dredged in flour to prevent their sinking, blend quickly, pour into greased, floured muffin rings and bake in a moderate oven. These make a delicious dessert when arranged for individual servings and topped with whipped cream.

Sour Cream Cake

3 eggs	2 t. baking powder
1 c. sugar	1 t. lemon extract
1/2 c. butter	1/4 t. each of cinnamon, cloves and nutmeg
2 c. flour	1 c. raisins and nuts
5 T. sour cream	
1/4 t. salt	
1/2 t. soda	

Cream the butter and sugar, add beaten egg yolks, then sour cream blended with soda. Beat thoroughly, then add dry ingredients sifted together, flavoring, nuts, raisins and spices. Blend well, then fold in egg whites beaten stiff. Turn into buttered and floured layer tins and bake in a moderate oven. Recipe makes two nine-inch layers. When cool put layers together and cover top with any favorite icing, such as banana and whipped cream, plain boiled icing or mocha icing.

Oatmeal Cookies

1 1/4 c. sugar	1 t. ginger
1 c. shortening	2 c. flour
3 c. rolled oats	1 c. dates
2 eggs	1 t. soda
1/2 c. sour milk	1 t. salt
1 t. cinnamon	

Cream the shortening and sugar, add well beaten egg, rolled oats, dates, salt, spices, soda dissolved in milk and flour. (Slightly less salt will be needed if butter is used for shortening.) Mix well and drop from tip of spoon onto greased baking sheet. Bake in moderate oven 10 to 12 minutes.

Table of Equivalents

1 t. equals 1 teaspoonful
1 T equals 1 tablespoonful
1 c. equals 1 cupful (1/2 pt.)
1 pt. equals 1 pint (2 c.)
1 qt. equals 1 quart (2 pt.)
1 oz. equals 1 ounce
1 lb. equals 1 pound (16 oz.)
1 pkg. equals 1 package



WOMEN who appreciate the many modern short-cuts that save labor in the home, consider Kellogg's Corn Flakes one of the most satisfactory foods they can buy.

Costing only a few cents a package. No trouble to prepare. Always ready to serve. Delicious for meals and between meals. No wonder Kellogg's Corn Flakes are the world's most popular ready-to-eat cereal.

Have Kellogg's for breakfast, lunch, children's suppers, bedtime snacks. Extra crisp and easy to digest. Serve with milk or cream—and add bananas or honey. Delicious with home-canned fruits.

Naturally, Kellogg's Corn Flakes are imitated. But wise buyers put the name Kellogg on their grocery lists because they know that imitations never equal the wonderful flavor and extra value of genuine Kellogg's.

Oven-fresh at all grocers. Look for the red-and-green package. Made by Kellogg in Battle Creek.

The world's most popular ready-to-eat cereal—and a real farm product. It takes a whole year's bumper crop from 700 acres of corn to supply just one day's demand for Kellogg's. About 2,500,000 quarts of milk and cream are used daily. And tons of orchard fruits.

You'll enjoy Kellogg's Slumber Music, broadcast over WXYZ and associated stations of the N. B. C. every Sunday evening at 10:30 E. S. T. Also KXT Los Angeles, KOMO Seattle at 10:00, and KOA Denver at 10:30.

HAYES FRUIT-FOG SPRAYERS

Reach the topmost branches with a pest killing mist. It seeks out and destroys every crop-robbing disease. With the super powered Hayes No. 4124 atomization is so complete it reaches crevices only air can reach. Solutions go farther—substantial, economies result. Hayes underslung sprayers are designed for universal use; cut under wheels are particularly adapted to sandy soil and hills. Spray anywhere a team or tractor can travel. There is a Hayes Pump for every requirement. Send for free literature describing both power and hand pumps. Tell us what your particular sprayer problem is—we can help you solve it.



GREATER PRESSURE—MORE Capacity

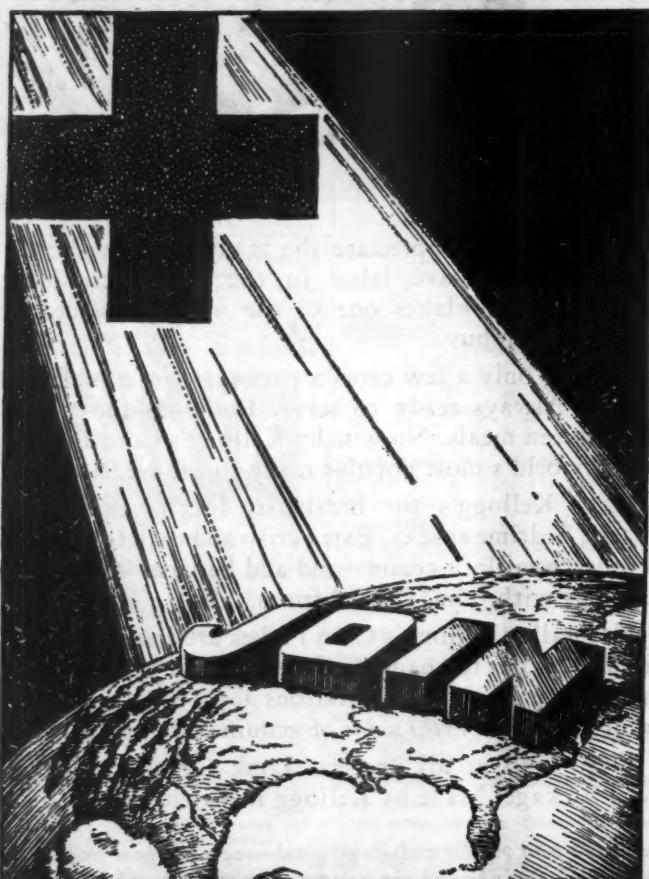
Illustrated above is the new No. 4124. Super powered, it has a capacity of 10 to 12 gallons per minute. Pressure of 300 to 400 pounds produce a fog so fine it floats like smoke. Tank has 200 gallon capacity. In the new 4124 you have a more powerful pump, greater pressure, oversize capacity and extra horsepower.

FARM TOOLS, Inc., Dept. 57, Mansfield, Ohio

Combining Roderick Lean, Vulcan Plow,
• Hayes Planter and Peoria Drill Divisions

10 First Prizes of \$700.00 Each!

FIND BUSTER KEATON'S "DOUBLE" Surely you've been told that you looked like some great movie star. People have often said that you reminded them of someone, haven't they? Maybe you've seen your exact "double" somewhere. Well, here is Buster Keaton—that solemn comedian star of Metro-Goldwyn-Mayer Pictures. He has a "double" in the poses below. Buster Keaton's "double" wears the same cap as Buster Keaton wears in one of his poses; his eyes are the same; so is his expression, hair, etc. These two, and only these two, are exactly alike—in fact, they look like twins. Can you find them—the two just alike? If you can, by all means send their numbers at once. Your answer will determine whether or not you'll have the opportunity to win one of ten equal first prizes. Hurry! The discovery by the orchardists that soil restorative practices are essential to the profitable production of fancy winter pears, has induced a large portion of the growers to build



THE AMERICAN RED CROSS

INCREASING PEAR YIELDS

By RALPH S. BESSE

FERTILITY was found to be the dominant factor in increasing the yield of pears, and therefore in reducing the cost of production, in the Rogue River Valley when the records of 6342 acres of bearing pears were recently analyzed by the Oregon Agricultural Experiment Station. Other factors, such as orchard heat-

commercial fertilizer spent an average of \$6.47 per acre for the practice, the cost of pears produced was 10 cents per box less than it was on the farms using no fertilizer or other soil-building method. The gross value of the fruit harvested from the fertilized orchards was \$66.60 greater than it was from the unfertilized

INFLUENCE OF FERTILIZER

Three-year Average Crops of 1924-1925-1927

Fertilizer Practice	Number of Records	Average Yield Per Acre (Boxes)	Average Cost Per Box	Ave. Cost Fertilizer Per Acre
Used no commercial fertilizer but practiced clean cultivation	68	108	\$1.62	\$0.00
Used commercial fertilizer and clean cultivation	34	145	1.52	6.47

ing, number of cultivations, number of sprays, age of trees, and time devoted to pruning and blight control, were found to work jointly with fertility in influencing yields. The combined beneficial effect of these factors, however, was more pronounced when suitable fertility was available.

The common practice of application in this district is that of placing the fertilizer around the spread of the tree in the late fall or early winter so that it will quickly pass into the root area. The amount used varies from three to five pounds per

crops. Response to commercial fertilizer varied, of course, on the different farms, and it is always necessary for the individual farm to determine by actual test its need for fertilizer in the commercial form.

The discovery by the orchardists that soil restorative practices are essential to the profitable production of fancy winter pears, has induced a large portion of the growers to build



A good vetch cover crop in the C. A. Richmond pear orchard, Central Point, Ore.

up fertility by various systems of management. These methods include the addition of commercial fertilizer, the use of an annual cover crop to be plowed under each year, or the maintenance of a permanent cover crop of sweet clover or alfalfa which is mowed down and disked into the soil. Some growers even haul alfalfa hay, grain straw, or barnyard manure onto their orchards, and a few growers combined several of these methods. It was found that the heavy applica-

tree, which is an approximate range of from 200 to 400 pounds of fertilizer per acre. This fertilizer usually consists of nitrate of soda or sulphate of ammonia, to which in a few cases is added superphosphate and other fertilizer ingredients.

Handsome Returns from Cover Crops

The pear growers who used cover crops to maintain soil fertility in their orchards produced an average of 76 boxes more pears per acre at an average of 26 cents per box less

THE EFFECT OF COVER CROPS ON FIELD AND COST

Three-year Average Crops of 1924, 1925, 1927

Practice	Number of Records	Average Yield Per Acre (Boxes)	Average Cost Per Box
Used no cover crop or fertilizer	68	108	\$1.62
Used cover crop but no fertilizer	22	184	1.36

tion of hay or straw, however, caused an unusual hazard from fire, and such inflammable material is seldom spread over the orchard until after the fall rains have set in.

Fertilizer Profitable

Each dollar spent for commercial fertilizer produced \$10 in additional gross returns on the 34 farms using this kind of fertility. The pear growers who applied commercial fertilizer to their orchards produced an average of 37 boxes per acre more fruit than was obtained by the growers who used no soil-building agency.

Although the orchardists who used

cost than those growers who used neither commercial fertilizer nor cover crops as a soil builder.

The cost of a cover crop does not involve a large expenditure. It consists chiefly in the cost of the seed, which averaged \$1.77 per acre on those farms using it, and the labor of seeding, which required an average of 1.3 man hours and 2.5 horse hours per acre on those farms using horses to do the work, or 1.3 man hours and 1.1 tractor hours on those farms using tractor power.

"More fertility and larger yields" is a slogan rapidly becoming established among the pear growers.



LESS LABOR IN SPRAYING

If the ideas of several fruit growers are taken up generally, it looks as if the day is past when a man can sit on the sprayer and lazily guide the tractor or team, while he dreams of fish he didn't catch or melons "smilin' in de sun." Two fruit growers mentioned here have taken a telling blow at the foregoing pastime.

Ralph L. Short, who operates an apple orchard near West Point, Ill., found himself short of help to apply the last spray of the season. Not to be outdone, he took the spray rod in his own hands and sprayed as he drove. By running the tractor in low gear he had ample time to cover small trees as the tractor and sprayer passed them. In one day he hauled water and applied 1800 gallons of material, between 7:30 a. m. and 5:45 p. m.

Two hundred and ten acres of apple trees owned by the Lake Erie Orchard Company are sprayed with a two-man, tractor-powered outfit. The man on the sprayer tank handles a long spray gun, equipped with a cluster of nozzles. He applies spray to the upper part of the trees. From the tractor seat, the driver holds a similar set of nozzles on the lower branches. The hose of this spray gun is attached at two points to the tractor, so that all the recoil is taken up. The nozzles are turned downward at an angle just sufficient to make the spray rod practically float in the air. This makes it easy for the operator to hold the gun with one hand and drive with the other. Such a set-up saves the services of one man and enables the outfit to make an even more thorough coverage of the orchard.

IF 1931 PROVES TO BE A BUMPER CROP YEAR—



NEXT fall and winter, if the trees are loaded, there will be a strictly buyers' market. With a surplus of apples in warehouses, only the fancy fruit will bring prices that contain profit for the growers.

One of the most important factors in producing firm, healthy, worm-free apples is the effective control of insects and disease now. And effective control begins with the selection of good spray and dust materials.

The fruit grower who sees to it that only GRASSELLI Insecticides go into the tank

Your crop PROFITS will depend upon more FANCY FRUIT

of his spray rig has taken a long step toward crop quality.

As the dilute mixture spreads over the trees he has the comfortable assurance that his orchard is PROTECTED.

Insist on GRASSELLI, which insures fresh stocks shipped in the original packages from nearby manufacturing points. For prompt service, there's a Grasselli dealer near you—if not, write us.

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WHERE TO SEND FOR SPRAY SCHEDULES

State	Institution	Address
ALABAMA	Alabama Polytechnic Institute	Auburn
ARIZONA	University of Arizona	Tucson
ARKANSAS	University of Arkansas	Fayetteville
CALIFORNIA	College of Agriculture, Univ. of California	Berkeley
COLORADO	State Agricultural College	Fort Collins
CONNECTICUT	Connecticut Agricultural College	Storrs
DELAWARE	University of Delaware	Newark
FLORIDA	College of Agriculture, Univ. of Florida	Gainesville
GEORGIA	State College of Agriculture	Athens
IDAHO	University of Idaho	Moscow
ILLINOIS	University of Illinois	Urbana
INDIANA	Agricultural Experiment Station	Lafayette
IOWA	Iowa State College	Ames
KANSAS	State Agricultural College	Manhattan
KENTUCKY	University of Kentucky	Lexington
LOUISIANA	Louisiana State University	Baton Rouge
MAINE	University of Maine	Orono
MARYLAND	Agricultural Experiment Station	College Park
MASSACHUSETTS	Massachusetts Agricultural College	Amherst
MICHIGAN	Michigan State College	East Lansing
MINNESOTA	University of Minnesota	St. Paul
MISSISSIPPI	Mississippi A. and M. College	A. & M. College
MISSOURI	University of Missouri	Columbia
MONTANA	Agricultural Experiment Station	Bozeman
NEBRASKA	Agricultural Experiment Station	Lincoln
NEW HAMPSHIRE	University of New Hampshire	Durham
NEW JERSEY	New Jersey State Agricultural College	New Brunswick
NEW MEXICO	New Mexico College of Agriculture	State College
NEW YORK	New York Agricultural Experiment Station	Geneva
NORTH CAROLINA	North Carolina State College	Raleigh
NORTH DAKOTA	North Dakota Agricultural College	Fargo
OHIO	Ohio State University	Columbus
OKLAHOMA	Oklahoma A. and M. College	Stillwater
OREGON	Oregon Agricultural College	Corvallis
PENNSYLVANIA	Pennsylvania State College	State College
RHODE ISLAND	Rhode Island State College	Kingston
SOUTH CAROLINA	South Carolina Experiment Station	Clemson College
SOUTH DAKOTA	South Dakota State College	Knoxville
TENNESSEE	University of Tennessee	College Station
TEXAS	A. and M. College of Texas	Logan
UTAH	Utah State Agricultural College	

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They are built to stand hard bumps and jolts. H. P. Miller of Grantsville, Md., writes: "The Ospraymo potato sprayer I bought 10 years ago is still doing good work." John Smith, Westport, Mass., says: "Used your traction sprayer 29 years and still using it." J. Le Roy King of Tully, N. Y., says: "Union Leader has been going all spring and has performed wonderfully well."

They make two bushels grow where one grew before. As high as 600 bushels of potatoes per acre is possible if you SPRAY with our OSPRAYMO LEADER.

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VIRGINIA	Virginia Polytechnic Institute	Blacksburg
WASHINGTON	Washington Experiment Station	Pullman
WEST VIRGINIA	West Virginia University	Morgantown
WISCONSIN	Agricultural Experiment Station	Madison

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Highly effective against San Jose Scale, Leaf Roller, European Red Mite, Pear Psylla, Peach Cottony Scale and Aphids. Mixes easily with hard or soft water. Does not break down in freezing weather. Pleasant to use. Always uniform in quality... and very economical.

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THE JAPANESE QUINCE, AN ORNAMENTAL BEARING EDIBLE FRUIT

By A. S. COLBY

IN CONNECTION with a study being made by the Illinois Agricultural Experiment Station of woody shrubs planted chiefly for the interest and beauty of their bloom (Figure 1), but which are also of potential value for the edible qualities of their fruit, some attention has been given to the *Chaenomeles* species, formerly included in *Cydonia*, and commonly known as the Japanese quince. These are ornamental plants usually grown

While ornamental shrubs are usually chosen for some particular plant character, such as vigor of growth, beauty of bloom, and size of individual flowers, it was found that several Japanese quince varieties under observation were very desirable from the standpoint of the fruit produced as well.

Some of the fruits are about as large as the common European market quince. They are five-celled, with many seeds in each cell. The shape varies from ovoid to round. They are borne on wood two or more years old, usually singly, sometimes in two's, often with a stem so short that the fruit at the stem end has the appearance of having partially surrounded the branch (Figure 2). The character of the skin surface was found to vary from dry and smooth to waxy and very sticky. Where the skin was dotted, the dots were more conspicuous on the side of the fruit exposed to the sun. Storage tests showed that the fruit would hold up very well in cold storage, all the varieties listed keeping in good condition for five months or more at a temperature of 32 degrees Fahrenheit. The skin has a very pleasant odor, even filling a room with fragrance where a dish of quinces is kept for a short while.

While the fruits are very hard, even when mature, it has been known to a few that they contain considerable

per cent). Other valuable characteristics are its low sugar content, light color and absence of citric acid. The acid present is 100 per cent malic. The fact that the fruit tissues contain no starch (unlike the European quince) makes possible the direct use of its juice with other fruits in preserving without introducing the characteristic cloudy appearance found when the European quince is used.

The fruit has little, if any, flavor,

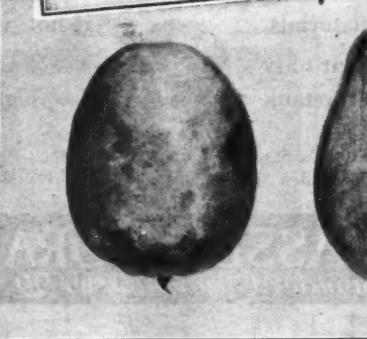


Figure 1. Japanese quince (*Chaenomeles japonica*) blossoms.

for their handsome, brightly colored flowers, which appear early in the spring. Under some conditions the flowers are followed by fruits which vary in size and shape according to the species, usually yellow in color when mature, often fragrant, and, in some species, of considerable culinary value.

In the summer of 1922 the Arnold Arboretum, near Boston, was visited and arrangements made whereby their co-operation was secured in a study of the fruit and plant characters of the collection of *Chaenomeles* species there, probably the largest extant. Grateful acknowledgment is hereby made for this co-operation.

Brief notes have been published from time to time with reference to the possible culinary value of the fruit in addition to its generally recognized value as an ornamental (Figures 1 and 2). It was thought advisable, however, at this time to present a somewhat fuller, though incomplete report of the progress of the investigation carried on up to date, based upon the use of material both at the arboretum and on the Illinois station grounds.

Figure 3. Fruits of representative Japanese quinces. From left to right: *Chaenomeles superba atrosanguinea*, *Chaenomeles laegenaria fructu alba*, *Chaenomeles laegenaria versicolor*, and *Chaenomeles laegenaria grandiflora*. (One-half natural size.)

quantities of pectin and fruit acids and salts which make them a valuable addition to our present lists of fruits available in the canning and preserving industry. The fruit (Figure 3) of the following varieties is especially adapted to supply the needed pectin and acidulant in making aromatic jellies and conserves with apples, plums and cherries:

Chaenomeles laegenaria Baltzii, *Chaenomeles laegenaria versicolor*, *Chaenomeles laegenaria columbiana*, *Chaenomeles laegenaria semperflorens*, *Chaenomeles laegenaria grandiflora*, *Chaenomeles laegenaria nivalis*, *Chaenomeles laegenaria fructu alba* and *Chaenomeles superba atrosanguinea*.

It has been learned only recently that the Japanese quince is the best commercial source of a valuable fruit acid, available without sacrificing its pectin and therefore its jelly-making qualities. These investigators found that the fruit has a very high laevulose-malic acid content (4.0 to 5.75



Figure 2. Typical fruiting habit of the Japanese quince.

and therefore should not be used alone. Because of its high laevulose-malic acid content, however, the juice can be used to advantage with fruits like the cherry, plum, quince, apricot and apple where the acid content is mainly laevulose-malic, but does not furnish in itself sufficient acidity to bring out all the individual fruit flavor which is present.

The Japanese quince is a native of China and Japan, and, though introduced into this country years ago, it has not been greatly in demand nor featured as especially desirable by nurserymen. Its lack of popularity may have been partly due to its susceptibility to San Jose scale. However, with the recent advances in control measures since the introduction of oil sprays, it has been found possible to combat the scale effectively. Again, it has been the common practice to set out but one variety of the Japanese quince where used for ornamental purposes and, due to self-sterility, little or no fruit sets. Few people, therefore, know of its possibilities as a fruiting plant. The flowers of the quince open early in spring. Minimum temperatures vary

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An interrig is that may be tu is out. Teral inch the oper any wid

The sp used to substitu booms. The outer end and the This fea large or s

Slice A new apples w tives and the color announced State Can Rochester, was pointe ing to use now have allow for and peelin it is said. After be apples are

The Ma spected to containing none of w versals in

What yo terday; wh you are ma

March, 1931

AMERICAN FRUIT GROWER

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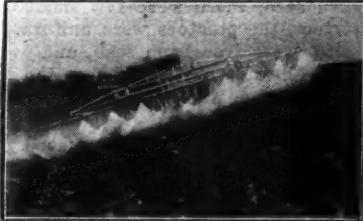
ing from 28 to 32 degrees Fahrenheit often occur during its blooming period and that fact may account for poor set whether or not cross pollination occurs.

Although the varieties of the Japanese quince most promising for fruit are not as yet available generally through the trade, the Illinois station has for some years acted in co-operation with nurserymen in advising their planting. It is hoped that a supply of some of the best varieties will soon be available. In the near future it is probable that even better varieties may be found by breeding and selection. This is being attempted at the Illinois station. In the meantime, with more demand and common use, it will be desirable that the most valuable varieties be given common names. It is suggested, for example, that *Chaenomeles laegenaria Baltzii* be known as the Baltz variety, and *Chaenomeles laegenaria columbiana* be called Columbia.

SPRAYING FIFTY ACRES DAILY

WHEN Fisher Brothers, potato growers near Boswell, Pa., spray their 75 acres of potatoes it is done with this 10-row, truck-mounted outfit in a day and a half. They have several fields which are a considerable distance from water and this fact prevents them from doing the job in even less time.

Although their fields are quite hilly, they have not experienced any diffi-



culty in spraying, even on the steepest hillsides.

An interesting feature of this spray rig is that the disk wheels of the truck may be turned so that the concave side is out. This increases the tread several inches and makes it possible for the operator to adapt the outfit to any width rows.

The sprayer on the truck may be used to spray orchard trees by substituting hose and spray guns for the booms. When going for water, the outer ends of the booms are folded up and the truck can travel as usual. This feature simplifies handling of large or scattered acreages.

Sliced Apples to be Frozen

A new process for freezing sliced apples without chemical preservatives and "without detracting from the color or flavor of the fruit" was announced before the New York State Canners, Inc., in convention at Rochester, New York, recently. It was pointed out that pie bakers wanting to use 100,000 pounds of apples now have to buy 150,000 pounds to allow for waste in removing cores and peeling slices. The new process, it is said, will eliminate this waste. After being peeled and sliced the apples are frozen in a container.

The Maine inspection service inspected to January, 1931, 433 cars containing 75,000 barrels of apples, none of which has met with any reversals in England.

What you are today, you made yesterday; what you will be tomorrow, you are making today.

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GROW "FANCY" FRUIT! Control the codling moth NOW. Every one that escapes your first application will give you that much more work in combating second and third broods later on. "Cash Crops" has a very practical comment on the apple growers' spraying and dusting problems. Whether you use Orchard Brand materials or not, we say to you—write for a copy of the 1931 "Cash Crops" and see how helpful its advice is.



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The Berlin Fruit Box Co. Berlin Heights, Ohio

BOYS PROFIT FROM STRAWBERRIES

By PARNELL KALLENBACH

SINCE grain farming is not profitable in our community, our Future Farmers' of America organization, after much discussion in the Vocational Agriculture class, came to the conclusion that for our community there were but four profitable enterprises for our project work: dairying, poultry raising, fruit growing and

late frost in the spring decreased the yield at least two-fifths.

Six hands were hired to help us pick the berries, the money for this labor being borrowed from our bank. The picking cost was \$45, not counting our own labor.

The berries were marketed through the Missouri Ozark Strawberry As-



My brother and I hoeing strawberries in our one and one-half acre patch. I am the one without a hat.

vegetable growing. As we have small fields and cannot compete with the Kansas and Iowa farmer in growing wheat and corn, we are going into business where less cultivated land is needed. We have an abundance of pasture land which can be turned into money through the use of it by a herd of dairy cows. The nature of vegetable growing is such that we can engage in this line of crop successfully, especially in view of the fact that we get the city price plus the cost of carriage.

As a result of the teaching of Prof. T. C. Wright, our teacher in vocational training, my brother and I set out one and one-half acres of strawberries in April, 1928. As we live on a creek bottom farm and late spring frost is a problem with us, we decided to have the project located on a hill so there would be less danger of frost. As strawberries grow better on new ground, we picked a field that had been cultivated only two years. The soil was rich and contained a large amount of humus.

We got the plants from a strawberry grower in our community through the aid of our instructor. They were government inspected and approved plants that were free from crown borer and disease. The soil was in good condition and the seed bed was firm when we received the plants, and it took us a little over two days to set out the plants.

During the first summer we plowed the plants eight times and hoed them four times. No hired labor was used in cultivating. After the plants began to produce runners, we placed them in the rows. We began to mulch the plants during our Christmas vacation. We used all the straw available on our father's farm and bought the rest from a neighbor. We mulched very heavily to hold the growth and blooming back until later in the spring. Even though we did this, a

sociation. They failed to bring us as much as they should, due to the large crop marketed last season. All our berries went as first-class product.

The yield was 88 crates and no doubt would have been 150 had it not been for the late frost. We received wages of 25 cents per hour and a net profit of \$8.17. The berries averaged \$2.31 per crate and brought \$203.28 for the total crop.

FLORIDA ORANGE FESTIVAL



MISS BERTHA KNIGHT, Bartow, Queen of the 1931 Florida Orange Festival in Winter Haven (January 27 to 31) and her ladies in waiting with boxes of prize oranges and grapefruit, gifts of Governor Doyle Carlton to his fellow governors and

President Hoover. Queen, top center. Ladies in waiting, left to right: Emily Deane, Bradenton; Winifred Murphy, Eustis; Kathleen Kelley, Lakeland; Edna Zinn, Winter Haven; Emma Laurie Smith, Bartow; Martha Clark, Lakeland, Florida.

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HOW TO CONTROL DEER DAMAGE

(From Page 7)

Many orchardists have tried to keep deer out of their orchards by fencing. From results of observations on fences of various heights and types, it is recommended that fences should be at least eight feet high and made of strands of wire not more than seven inches apart. Deer when pressed may surmount fences 10 or 11 feet in height. Although it is possible to build a fence that will keep deer from orchards, its cost makes it prohibitive to most farmers.

Asafoetida

The most successful method of controlling deer is by the use of asafoetida. This material is an imported gum supplied in three forms: gum asafoetida in mass, tears, and in powdered form. The lump or mass form is the proper one for use in deer control. Lumps the size of a golf ball are placed in a cotton sack, similar to a tobacco bag, and hung on each tree three to four feet from the ground. One pound of asafoetida, selling for 35 cents in small quantities, will make about 12 such pieces. The cloth bags cost about one cent each, or may be made by hand from cheesecloth for much less.

The repellent odor given off by the asafoetida will often keep the deer from trees treated in this manner. While the asafoetida remains soft this odor will continue, but on becoming hard, its effectiveness is lost. Therefore, with moist weather conditions one application of the bags may be sufficient for the summer season, but with dry weather the bags of asafoetida may harden in five or six weeks, and will need renewal.

Naphthalene Flakes

Another repellent material is naphthalene flakes, a chemical composition similar to moth balls. Naphthalene flakes sell for about five cents a pound in barrel lots. About two heaping tablespoons of flakes are used to a bag, one pound making about 10 bags. This material also is affected by weather conditions. In dry weather the bags last about eight weeks, and in wet weather about five weeks. During an average season the bags may need refilling about four times.

Automatic Flash Gun

A scaring device known as the automatic flash gun has also proved to be effective in keeping deer from orchards. The gun gives a loud explosion every few minutes, and in addition the pilot burner throws a beam of light in different directions as the gun swings about in the wind. The gun is hung from a tree or tripod four or five feet from the ground. It operates by water dripping on carbide, thus generating an explosive gas. Daily renewal of carbide and water is necessary. The gun sells for \$35, and carbide for about \$6 per 100 pounds; thus the operating cost is very small. The gun will not effectively protect an area of more than 1000 trees. It is generally set in operation a little before dusk and allowed to run until after daybreak, or until it can be conveniently turned off. Although deer might pass through the orchard while the gun is going, they usually will not stop to eat.

Tar-Paper Cones

The latest method for the control of deer is the use of tar paper. This method was tried last season by County Agent R. H. Lovejoy, of Sanford, Maine. Cut tar paper into pieces of about four by six inches and roll them into cones, fastening them

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Not a Worm in a Thousand Apples

A letter from LaFrance Fruit & Plant Farms, Holton, Kansas, says: "Not a worm in a thousand apples." These orchards were sprayed with NuREXFORM. A. B. Wompole of Clarkston, Michigan, writes: "Your NuREXFORM stands out in a class by itself. In its suspension and sticking qualities and in its low cost as measured by results obtained it cannot be equaled."

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It is to your advantage to write us for more complete information and prices. Address the nearest Rex Company.

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California Rex Spray Co.	Berkeley, Calif.
Payette Valley Rex Spray Co., Ltd.	Payette, Idaho

NuREXFORM

IMPROVED AND PATENTED
DRY ARSENATE OF LEAD

at the smaller end with paper clips, leaving an opening of about one and one-half inches. Slip the cones over the trees and let them rest about three feet from the ground on some of the side branches. For a newly planted tree or a small tree probably one cone is sufficient. It is believed that the scent from the tar paper will last from three to four months. At the end of this time some coal-tar repellent should be painted on the cones, or they should be replaced with new material. According to Mr. Lovejoy, this method gave 100 per cent control, but the deer may walk through the orchard without eating the trees.

Trapping Deer

Trapping, as a method of possible value in controlling deer damage, is discussed in a recent report by W. B. Grange, formerly superintendent of game for the State of Wisconsin. They have employed a new idea in trapping deer in shipping crates designed along lines suggested by the United States Biological Survey. The crates are fitted with a drop door, trigger, and treadle board, as are commonly used in box traps for smaller animals. The crate traps are then

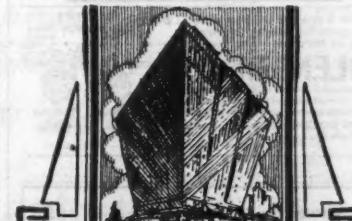
transported to the place where deer are known to be feeding extensively, camouflaged with brush, and baited with apples, oats, salt, and twigs. Deer were found to enter the traps freely, and were readily transported for restocking where desired. It is possible that the further development of this plan will provide a means of removing deer from the vicinity of cultivated areas to sections where they can do no harm.

Co-operative Marketing Guide

Issued

A guide for setting up local co-operative marketing associations in fruits and vegetables has just been issued by the Federal Farm Board as Bulletin No. 1 of the Board. The author is Harry C. Hensley, senior economist. The bulletin stresses the need for a sound organization plan with respect to financing and marketing agreements. Sample forms of an organization agreement, marketing agreement, articles of incorporation, and by-laws are included in the publication.

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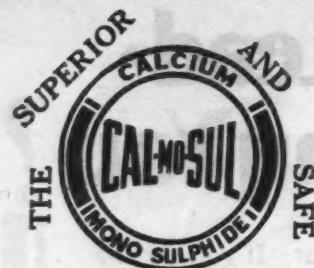


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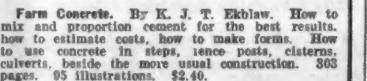
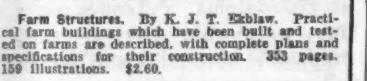
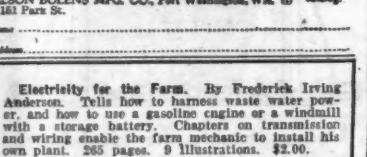
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Save Time and Money!



YOU WILL DELIGHT IN THE AMERICAN FRUIT GROWER'S TOUR [From Page 9]

supper and the sun's good night kiss on Rainier, Semand Park; for beauty of primitive forests, Roosevelt Park or Schmidt's. Do you think you can crowd all these things in 24 hours; if not take your choice of one or more.

Seattle is a city of delightful homes—from rustic, flower garlanded cottages to old-English estates. Other attractions for you to view include the University of Washington; the Cornish Musical Art Center; the noted Orthopedic Hospital for children. Seattle's retail business section is handsome, modern and filled with life and color.

In downtown Seattle, the public market overlooks the waterfront, which deserves particular mention. Its shoreline extends a hundred miles. Great ships warp into the docks bringing silk, tea, hemp, rice, chinaware, and vegetable oil, and take away an amazing array of articles from toothpaste to locomotives. It is the gateway to the Orient, the nearest American port. It is the gateway for Alaska, which sends out gold, copper, fish and furs to a waiting world. If you don't do anything else in Seattle, be sure and visit the "waterfront" and the famous market. So much for Seattle proper.

Mt. Rainier National Park

Within easy distance of Seattle is Mount Rainier National Park. The Milwaukee Road is the only railroad serving the park, and you will find the trip to the mountains at Ashford one of the outstanding features of the entire tour. To this national playground a full and glorious day will be devoted.

Here reigns the mighty monarch of America's mountains—Rainier—the snow-clad sentinel of the Pacific towering nearly three miles into the heavens. Gripping Rainier's upper heights is the largest single glacial system in the world—28 separate rivers of ice, some of them six or seven miles long. The tonic air of the great snowy peak will make you want to don the spiked boots and "tin pants" provided at the Paradise Inn, and follow an entertaining guide to one of the glaciers for snow sliding, or a hike over the thrilling skyline trail that ends among the clouds. Those who prefer may follow this trail on horseback.

In Paradise Valley, where we spend part of the day, is a two-mile belt of Alpine meadows knee-deep with many colored wild flowers—inviting the visitors to enjoy their brilliant hues as he hikes or rides on dim forest paths or mountain trails that lead to blue lakes and snow-capped summits. And there is rest and quiet enjoyment for the visitor who prefers to sit on the spacious veranda of picturesque Paradise Inn and gaze at the glorious mountain panorama.

Tacoma—Then On to California
From Mt. Rainier our party will return to Tacoma for dinner and

sightseeing. Tacoma, also on one of Puget Sound's splendid harbors, is full of attractions, and while we stay only for one evening, there is plenty of amusement to crowd in in the few short hours.

That night we will board a Union Pacific Special Train for Portland, arriving early Friday morning. From the train the entire party will be transferred to buses for a complete tour over the famous Columbia River Highway, passing beautiful Multnomah, Latourell, and Horsetail Falls, Cascade Locks, the Window Tunnel at Mitchell's Point, the State fish hatchery, and on to Hood River, with a loop trip into famous Hood River

The Itinerary

Lv. Chicago, Ill., Milwaukee Rd.	10:30 PM	Saturday,	July 18
Lv. Milwaukee, Wis., Milwaukee Rd.	12:30 AM	Sunday,	July 19
Lv. St. Paul, Minn., Milwaukee Rd.	8:30 AM	Sunday,	July 19
Lv. Minneapolis, Minn., Milwaukee Rd.	9:15 AM	Sunday,	July 19
Lv. Harlowton, Mont., Milwaukee Rd.	9:30 AM	Sunday,	July 19
Lv. Missoula, Mont., Milwaukee Rd.	10:30 AM	Monday,	July 20
Lv. Spokane, Wash., Milwaukee Rd.	12:30 PM	Monday,	July 20
Lv. Ellensburg, Wash., Milwaukee Rd.	10:15 AM	Tuesday,	July 21
Lv. Ellensburg, Wash., Milwaukee Rd.	4:10 AM	Tuesday,	July 22
Lv. Seattle, Wash., Milwaukee Rd.	8:15 AM	Wednesday,	July 22
Lv. Seattle, Wash., Milwaukee Rd.	11:30 PM	Wednesday,	July 22
Lv. Ashford, Wash., Milwaukee Rd.	7:30 AM	Thursday,	July 23
Lv. Ashford, Wash., Milwaukee Rd.	7:30 AM	Thursday,	July 23
Lv. Tacoma, Wash., Milwaukee Rd.	8:15 AM	Friday,	July 24
Lv. Tacoma, Wash., Milwaukee Rd.	10:30 PM	Saturday,	July 25
Lv. Portland, Ore., Union Pacific	1:15 AM	Sunday,	July 26
Lv. Portland, Ore., So. Pacific, (approx.)	1:45 AM	Monday,	July 27
Lv. Del Monte, So. Pacific, (approx.)	2:00 PM	Monday,	July 27
Lv. Del Monte, So. Pacific	8:15 AM	Tuesday,	July 28
Lv. Los Angeles, So. Pacific	11:00 AM	Thursday,	July 30
Lv. Los Angeles, So. Pacific	6:30 AM	Friday,	July 31
Lv. Brawley, Calif., So. Pacific	5:45 PM	Saturday,	July 25
Lv. Oakland (16th St. station) Special	7:45 AM	Sunday,	July 26
(Transfer to auto for scenic trip, crossing San Francisco Bay to San Francisco.)			
Lv. San Francisco, So. Pacific, Special	11:55 PM	Sunday,	July 26
Lv. Del Monte, So. Pacific, Special	4:30 AM	Monday,	July 27
Lv. Del Monte, So. Pacific	9:00 PM	Monday,	July 27
Lv. Los Angeles, So. Pacific	8:15 AM	Tuesday,	July 28
Lv. Los Angeles, So. Pacific	11:00 PM	Thursday,	July 30
Lv. Brawley, Calif., So. Pacific	6:30 AM	Friday,	July 31
(Motor cars through Imperial Valley, stepping at El Centro and Mexicali, returning to El Centro.)			
Lv. El Centro, Calif., So. Pacific	5:00 PM	Friday,	July 31
Lv. El Paso, Texas, So. Pacific	10:45 AM	Saturday,	Aug. 1
Lv. El Paso, C.R. & P.	5:00 PM	Saturday,	Aug. 1
Lv. Kansas City, C.R. & P.	6:30 PM	Sunday,	Aug. 2
Lv. Kansas City, Milwaukee Road	7:00 PM	Sunday,	Aug. 2
Lv. CHICAGO, Milwaukee Road	8:30 AM	Monday,	Aug. 3

Valley, where the apple is king upon countless acres of noted orchard lands. Through the great Columbia River Gorge the scenic effects are of highest rank, with towering, castellated walls everywhere overlooking the majestic river, one of the most beautiful in America. And the lofty white cone of Mt. Hood is a thrilling sight above the miles of apple trees. The Hood River country is also noted for its cherries and pears. Conveniently located packing plants, canneries, dehydration, preserving and picking plants afford a ready market for crops.

Our journey now takes us south from Portland to San Francisco and Los Angeles, with trips to California's orange kingdom, sunny Imperial Valley and many other points of professional interest—but let's leave the intimate details of these trips for another chapter.

Don't think for a minute that because we started talking about Seat-

tle that there isn't something to see between Chicago—your point of departure—and Seattle. The entire route of The Milwaukee Road is one of remarkable scenic beauty. From the time your de luxe "Milwaukee" train leaves the Union Station in Chicago until it glides into the metropolis of the Northwest, its steel trail is a steady succession of sparkling lakes, snow-capped mountains, colorful canyons and thriving cities. Your Special carries you past the blue waters and cool woods of northern Wisconsin—along the scenic Upper Mississippi for 140 miles to Minneapolis and St. Paul . . . on through the bountiful fields and vast plains of the Dakotas and Montana. Then the glorious mountain travel—four great ranges—the Belts, Rockies, Bitter Roots and Cascades—unfold scenes of wondrous splendor found in no other part of America.

And for 656 miles through these picturesque mountains, you ride behind the giant electric locomotives of The Milwaukee Road—miles of smokeless, sootless, cinderless riding ease. Electrification and its attendant cleanliness allows the operation of open observation cars during the summer months, and one can readily see and enjoy nature's grandeur.

You can't afford to miss the wonders the AMERICAN FRUIT GROWER's 16-day tour holds. It is not only sponsored by the magazine but by three great railroads—The Milwaukee Road, the Southern Pacific, and Rock Island Lines, which is assurance of the best of everything—trains, meals, hotels, sightseeing. Every necessary expense included, and expert travel guides to relieve you of all planning and other details. Plan now to be with the happy throng that departs from the Union Station, Chicago, at 10:30 Saturday morning, July 18.

We shall tell you more about this marvelous trip in later issues of this magazine. An illustrated booklet is now in course of preparation giving the itinerary of this Wonder Tour in more interesting detail. This booklet will be mailed to applicants as soon as issued. Send in now the coupon for information about the cost, which you will find surprisingly low.

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ADDRESS

FIRE BLIGHT FROM BEEHIVES

(From Page Five)

spring blight. Each season the work was begun in midwinter and extended daily, including Sundays, from then to the time when blight first appeared. Several thousand cankers of the previous season's blight were tagged so as to aid the eye in locating any possible areas where oozing might appear, and attention was particularly focused on a group of unpruned pear and apple trees which had been badly blighted the year previous. When any twig or limb showed signs of oozing it was either brought immediately into the laboratory for further study, or its position carefully noted and all new growth subsequently developing in its vicinity given special attention.

A number of previously blighted twigs and limbs were thus found which showed a slimy or sticky ooze on the surface, and microscopic examination of this ooze invariably showed the presence of bacteria, fungous spores, pollen grain and other bodies. But when this ooze was applied to very susceptible pear twigs (attached to pear trees, over 100 of which were maintained in a greenhouse) there was only one case found in which the ooze contained virulent germs and this was on a blighted Spitzenburg apple twig which had developed a droplet of ooze in the laboratory.

In other words, on several hundred trees of susceptible varieties, all the ooze noted prior to the development of the first spring blight, had failed to yield evidence to show that it was responsible for this blight, despite the fact that excellent evidence was obtained indicating that on these trees about two per cent of the twigs and limbs blighted the year previous harbored infectious fire blight germs over each winter.

Blight Appears First in Blossoms

If such blighted tissues had not extruded the bacteria and were not responsible for the first spring blight, where then did the germs come from? One lead after another was exploited in an effort to solve this problem, only to find it leading to a blind alley. For three years the mystery threatened to remain as deep and unsolved as when the investigations were first undertaken. Gradually, however, one fact was established which seemed to lead in a particular direction. Each year it was noted that with rare exceptions the first blight appeared in the blossom clusters.

In the meantime the writer and others had found that contrary to previous assumptions, the blight bacteria in a water suspension could easily penetrate young pear and apple leaves in the absence of wounds or of insect carriers. But in spite of this fact the blossoms were the main seat of the early infections. Was it possible that the germs were brought to the blossoms by pollen and nectar-seeking insects and that these insects had harbored the germs over winter within their living quarters? As the honeybee is the chief pollinating agent of fruit trees, could it be that this "friendly little sprite" was playing the dual role of Dr. Jekyll and Mr. Hyde?

Blight from Infected Beehives

Investigations were thus undertaken on 10 beehives located in an apple orchard which had suffered seriously from blight. Hundreds of inoculations on healthy pear trees were made from samples of honey plus comb, pollen cells, and brood cells taken from these hives throughout the summer,

(To next page)

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winter and early spring prior to the development of blight.

Briefly, it may be recorded that the fire blight germ was isolated time and again from this material and from the bees themselves taken from the hives in early spring prior to any signs of blight in the orchard. Such cultures were in every instance proved to be infectious and disease-producing on healthy pear trees in artificial inoculation tests.

Thus it was proved that the infected beehive is at least in part responsible for the current season's blight, and it should be added that shortly after the writer's first technical publication on this subject partial confirmation was soon afforded by another investigator working in a region considerably removed from the Ozarks of Arkansas and Missouri.

Conclusions

These investigations point to the following conclusions: On early blooming pear and apple varieties which had suffered a severe epidemic of blossom blight and in which the blighted blossoms were widely scattered, the infection was probably brought into the orchard by infected

Principles of Fruit Growing By L. H. Bailey

Practical information for growers of every kind of tree and bush fruits. Describes the best location for an orchard. Tells how to plant, cultivate, prune, spray and do every operation necessary to high production. Methods of harvesting, grading and marketing are described.

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GEORGIA APPLE EXCHANGE TO CONTINUE TO FUNCTION

THE Consolidated Apple Growers' Exchange, a co-operative organization which handles the sales of growers in Georgia's famed apple belt, is solvent, cannot be forced into bankruptcy and will continue to do business in its own name, it was announced by officials following a verdict in its favor before Judge Sibley, in the United States Court for the Northern District of Georgia, convened at Gainesville.

Louis B. Magid, apple grower of Tallulah Falls, and others, who sought to force the exchange into bankruptcy, lost their case, a jury deciding that the contentions of the complainants were ill-founded and without merit.

The growers' exchange, of which Dr. Stephen A. Barnett, Atlanta, prominent physician and apple grower, is president, and J. Caldwell Porter, Cornelia, resident manager, is generally recognized as a big asset to the apple industry of this section and State. It works entirely in the interest of its members, securing for them markets for disposing of their harvests at the best possible prices, and financing them through the season of production. Last season, it was stated, many thousands of dollars were saved growers through the co-operative purchase by the exchange of fertilizers and spray chemicals.

The legal proceedings attracted widespread interest in Georgia and over the Southeast where the Georgia Red Apple is celebrated in song and story, and was hailed here, where thousands gain a livelihood from the industry, with great gratification. There stands, in Cornelia, what is said to be the only monument in the world erected to an apple. It is a replica in stone of an apple, measuring 16 feet in diameter, and reposes on a pedestal in front of the railroad station.—Frank C. Gilreath, Georgia.

"THE BIG RED APPLE"



ON U. S. Highway 36, eight miles west of St. Joseph, Mo., is located "The Big Red Apple," property of Hunt Brothers, who have over 600 acres of apple orchard near the location of this apple. Every convenience for the traveling public is included in this 30-foot-high apple: gasoline service, rest rooms, refreshments, courteous attendants, and novel roof garden, with dance floor and camping grounds adjoining. The apple is over 100 feet in circumference.

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FIG. 2416

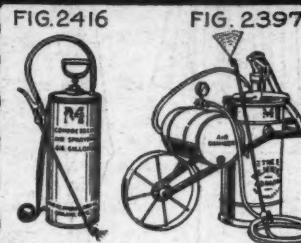


FIG. 2397



FIG. 2569

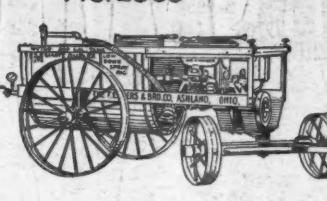


FIG. 1521 FIG. 1726 FIG. 640



Buyers' Service Bureau

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SPRAY MATERIALS

- Miscible Oil
- Fish-Oil Soap
- Dry Lime-Sulphur
- Liquid Lime-Sulphur
- Bordeaux Mixture
- Copper Sulphate
- Hydrated Lime
- White Arsenic
- Arsenate of Lead
- Colloidal Sulphur Sprays
- Sulphur-Lead Sprays
- Summer Oil
- Contact Sprays for Sucking Insects
- Combination Insecticide and Fungicide
- Calcium Caseinate

DUST MATERIALS

- Dormant Dust
- Superfine Dusting Sulphur
- Sulphur-Lead Dust
- Monohydrated Copper Dust
- Copper-Lead Dust
- Nicotine Dust

NURSERY STOCK

- Plants
- Trees
- Small Fruit Plants
- Strawberry Plants
- Ornamentals
- Perennials

MISCELLANEOUS ORCHARD EQUIPMENT

- Orchard Heaters
- Orchard Thermometers
- Thermometers
- Microscopes
- Pruning Tools
- Grafting Tools
- Grafting Wax

SPRAYING EQUIPMENT

- Power Spray Rig
- Horse Traction Rig

CART RIG, HAND PUMP

- Barrel Outfit
- Compressed Air Sprayer
- Hand Spray Pump
- Power Spray Pump
- Spray Rig Tank
- Water Supply Tank
- Supply Tank Tower
- Pipe and Fittings
- Pressure Spray Hose
- Spray Nozzles
- Spray Rods
- Spray Guns
- Spray and Dust Masks

MISCELLANEOUS CONTROL EQUIPMENT

- Codling Moth Bands
- Fumigants for Root Insects
- Sticky Preparations

FOR THE HARVEST

- Ladders
- Fruit Pickers
- Picking Sacks
- Berry Crates and Fillers
- Box and Shook Stock
- Bushel Baskets
- Tub-shape Baskets
- Less-than-bu. Baskets
- Fiber Fruit Packages
- Package Labels
- Canning Equipment
- Fruit Dryers or Dehydrators
- Fruit Pitters
- Peeler
- Corers
- Slicers
- Grading Machinery
- Fruit Cleaners
- Fruit Presses
- Cider Presses
- Pasteurizing Outfits
- Barrel Facers
- Basket Facers
- Barrel Presses
- Box Presses
- Liners and Cushions
- Stencils
- Wax Paper

TILLAGE TOOLS

- Single Walking
- Single Riding
- Riding Gang
- Disk Plows
- Horse Harrow
- Tractor Tillage Tools
- Horse Cultivators
- Hand Cultivators
- Grape Hoe
- Spike-tooth Drag
- Springtooth Drag
- Subsoiler, Horse
- Subsoiler, Tractor
- Rakes
- Hoes
- Scuffle Hoe

FARM TOOLS, ETC.

- Gasoline Engines
- Kerosene Engines
- Carpenter Tools
- Machinists' Tools
- Pipe Fitting Tools
- Masons' Tools
- Plasterers' Tools
- Lathes
- Buzz Saw Outfit
- Stump Pullers
- Fencing Tools
- Post Hole Diggers
- Shovels
- Picks
- Axes
- Electrical Wiring Tools

FERTILIZERS

- Nitrogen Fertilizers
- Phosphates
- Potash Salts
- Mixed Mineral Fertilizers
- Animal Manures
- Agricultural Lime

DUSTING EQUIPMENT

- Power Dusters
- Power Mixer and Duster
- Traction Cart Duster
- Hand Power Duster
- Kapsack Duster

SEED

- Garden
- Field
- Flower
- Bulbs
- For Cover Crops
- Seed Potatoes

ELECTRICAL

- Wiring and Lighting Supplies
- Electrical Refrigeration
- Vacuum Cleaner
- Kitchen Motor
- Sewing Machine Motor
- Separator Motor
- Electric Fans
- Floor Lamps
- Electric Milker
- Electric Water Pumps
- Electric Iron
- Grills
- Heaters
- Vibrators

AUTO ACCESSORIES

- Tires
- Batteries
- Spark Plugs
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FASHIONS



131

297

193

131

297

193

160

193—A smartly simple one-piece type in light weight woolen, is lengthened with a box-plaited flounce that flares prettily in motion. The notched rever collar gives tailored aspect. Sizes 16, 18, 20 years, 36, 38, 40 and 42 inches bust. The 36-inch size requires 3½ yards of 39-inch material with ¼ yard of 35-inch contrasting.

297—A rose-red flat crepe is intriguing with the moulded bodice giving the effect of a basque. The deep capelet collar is youthfully becoming. The circular skirt widens into fluttering fulness at the hem. Sizes 12, 14, 16, 18 and 20 years. The 16-year size requires 3½ yards of 39-inch material with ½ yard of 35-inch contrasting.

131—Practical and very charming in rose-brown canton crepe. The pleated ruffling is smart detail. The circular skirt hugs the figure. The hem displays soft rippling fulness. Sizes 16, 18, 20 years, 36, 38, 40 and 42 inches bust. The 36-inch size requires 3½ yards of 39-inch material with 4 yards of plaiting.

160—A crepe satin is given unusual treatment in draped eurpice bodice. Caught with buckle it marks the normal waistline. The grouped plaits give the skirt a wrapped effect which is very slimming. Sizes 16, 18, 20 years, 36, 38, 40 and 42 inches bust. The 36-inch size requires 3 yards of 39-inch material with ½ yard of 35-inch contrasting.

Dress Patterns may be secured by mail, postage prepaid, at 15 cents each from AMERICAN FRUIT GROWER PATTERN SERVICE, 53 W. Jackson Blvd., Chicago, Ill. Be sure to state size required. Enclose 10 cents additional for copy of Fashion Magazine (15 cents where no pattern is ordered).

